THE IMPACT OF MERCURY RELEASES AT THE OAK RIDGE COMPLEX

HEARING

BEFORE THE

SUBCOMMITTEE ON
INVESTIGATIONS AND OVERSIGHT

AND THE

SUBCOMMITTEE ON
ENERGY RESEARCH AND PRODUCTION

OF THE

COMMITTEE ON
SCIENCE AND TECHNOLOGY
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CONTENTS

WITNESSES

July 11, 1983: Page

Joseph La Grone, Manager, Oak Ridge Operations Office, U.S. Department of Energy, accompanied by Jim Foutch, deputy chief counsel for legal services, Oak Ridge Operations Office, and Dr. William Bibb, acting assistant manager for environment and safety, Oak Ridge Operations Office 5
Howard D. Zeller, Assistant Regional Administrator for Policy and Management, southeastern region, U.S. Environmental Protection Agency, accompanied by Arthur Linton, Federal Facility Coordinator, southeastern region; Jay Sargent, Regional Counsel, southeastern region; and Douglas McCurry, Senior Staff Member for RCRA Permitting, EPA.. 137
Dr. Michael T. Bruner, assistant commissioner, Tennessee Department of Health and Environment, accompanied by Barry Sulkin and Terry Cothron, technical staff, Tennessee Department of Health and Environment 186
David Freeman, Director, Tennessee Valley Authority, accompanied by Ralph Brooks, Division of Air and Water Resources, TVA; Larry Farr and Jack Milligan, Water Quality Branch, TVA; and Bill McMaster, expert on ground water and geology in Oak Ridge area 198
Dr. Chester R. Richmond, associate director for biomedical and environmental sciences and Dr. Stanley I. Auerbach, director, Environmental Sciences Division, Union Carbide Corp., Oak Ridge National Laboratory.. 246
Dr. Nathaniel Revis, Oak Ridge Research Institute 297
Dr. Charles Coutant, city of Oak Ridge, Environmental Quality Advisory Board 303
Dr. Frank D'Itri, Institute of Water Research, Michigan State University. 310
Edward A. Slavin, Jr., editor, the Appalachian Observer 332
Dr. Stephen B. Gough, former employee of Oak Ridge National Laboratory, Environmental Sciences Division 387
James Fuzzell, chairperson, client council 437
Terry Weaver, president, Oak Ridge Branch, National Association for the Advancement of Colored People 440
Dean Hill Rivkin, board member, Legal Environmental Assistance Foundation, University of Tennessee College of Law 449
A. K. Bissell, former mayor, city of Oak Ridge, Tenn 505
Jeffrey Ginsburg, president, Oak Ridge Chamber of Commerce 509
Benjamin Adams, chairman, Roane-Anderson Economic Council 514
Jo Ann Garrett, chairman, Committee of Fifty 518
Robert G. Keil, president, Atomic Trades and Labor Council 524

Appendix A—Additional material submitted for the record:

1. Documents pertaining to the Y-12 environmental assessment 533
2. Memorandum from J. F. Wing to J. Elwood 563
3. Documents pertaining to the Elwood report 583
4. Documents pertaining to ORO-TVA correspondence 594
5. LEAF notice of intent to sue—suit filed September 1983 615
6. Miscellaneous correspondence 619
7. Documents pertaining to DOE's RCRA and CERCLA exemption claims.. 697
8. Chronologies of events 793

Appendix B—Supplemental questions and answers received from:

Department of Energy 809
Michael T. Bruner—Tennessee Department of Health and Environment ... 831
Nathaniel W. Revis—Oak Ridge Research Institute 868

Appendix B—Supplemental questions and answers received from—Continued

	Page
Jeffery Ginsburg—Oak Ridge Chamber of Commerce	871
Chester R. Richmond—Oak Ridge National Laboratory	882
Stanley I. Auerbach—Oak Ridge National Laboratory	901
Supplemental statement was received from Dr. Stanley Auerbach, Oak Ridge National Laboratory, after the hearing.*	906
Stephen B. Gough *	919
Frank M. D'Itri—Michigan State University	932
Dean H. Rivkin, Gary A. Davis—Legal Environmental Assistance Foundation	934
Robert G. Keil—Atomic Trades and Labor Council	937
Charles E. Coutant—Environmental Quality Advisory Board, city of Oak Ridge	940
Howard D. Zeller—U.S. Environmental Protection Agency	947

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* Dr. Gough has considered submitting additional testimony in response to Dr. Auerbach's statement, but declined to do so after discussions with ERP staff.

THE IMPACT OF MERCURY RELEASES AT THE OAK RIDGE COMPLEX

MONDAY, JULY 11, 1983

House of Representatives,
Committee on Science and Technology,
Subcommittee on Investigations and Oversight,
Subcommittee on Energy Research and Production,
Oak Ridge, Tenn.

The subcommittees met, pursuant to call, at 8:57 a.m., in the auditorium, American Museum of Science and Energy, 300 South Tulane Avenue, Oak Ridge, Tenn., Hon. Albert Gore and Hon. Marilyn Lloyd presiding.

Mrs. Lloyd. Good morning, ladies and gentlemen. This is a very important meeting and I appreciate the outstanding witness turnout.

I believe it would be useful for me to outline what strongly reinforces my interest here in the mercury contamination issue as well as the subcommittees' interest.

The Subcommittee on Energy Research and Production, which I chair, authorizes nuclear fission R&D and magnetic fusion energy programs for the DOE, of which many of the activities are conducted at the Oak Ridge National Laboratory, and the gas centrifuge development activity carried out at K–25 as well.

Our subcommittee also authorizes funding for the uranium enrichment activities of the Oak Ridge Gaseous Diffusion Plant joint with other committees of the House.

Moreover, our Science and Technology Committee is responsible for fossil conservation and basic research programs at ORNL.

Thus from the perspective of committee responsibilities, I have a great interest in all aspects of the Oak Ridge pilot programs and related activities, including environmental effects and their mitigation.

Furthermore, our subcommittee has institutional jurisdiction over the Department of Energy's Oak Ridge Operations Office, since it serves as a field office for all the programs I have mentioned.

Finally, I am a member of the Subcommittee on Procurement in Military Nuclear Systems of the House Armed Services Committee, which authorizes all DOE defense activities at Oak Ridge, including those conducted at the Y–12 plant.

My chief objectives in holding this hearing with Mr. Gore are to: one, understand the history of the extent of the mercury contamination problem and the reason that it was handled in the way that it was.

Two, what are the potential impacts from mercury contamination from Y-12's activities? In these contexts, I wish to know whether DOE, ORO is serving as a just steward in discharging its environmental responsibilities.

Three, I want to understand what information, including that to be derived from further analysis, experiments, and monitoring, is required to arrive at a solid, scientific basis for remedial action if it is indeed warranted.

I am also specifically concerned about any potential environmental problems with respect to the ORNL and the gaseous diffusion plant facilities, which my subcommittee directly oversees.

Finally, I believe that DOE should capture the lesson learned from this mercury contamination problem such that DOE can assure that similar occurrences, environmental or otherwise, will not be handled in this manner. Our overall aim to have government at all levels work for the good of the people is my concept of good government.

I believe a generic problem that we must recognize is that the DOE is operating 1950 facilities, while striving to comply with environmental requirements of the 1980's. To achieve such compliance will require constructive cooperation on the part of the EPA and the State with DOE, and I am committed to working in both of my committees of the Congress to secure funds for environmental improvement at DOE facilities.

I should emphasize, however, that in my efforts to resolve the environmental questions for the good of the citizens of Oak Ridge and the Government, I will not accept attempts to use these issues as mere instruments for disrupting legitimate national defense activities.

Also, as regards DOE's environmental stewardship, we must recognize that there are honest differences among DOE, EPA, and the State of Tennessee as to the degree of applicability of Federal hazardous waste legislation and as to what constitutes compliance with requirements of such legislation. And I am looking forward to an honest discussion of this issue by the appropriate parties.

This mercury problem and related environmental questions are an unfortunate part of the heritage of Oak Ridge, but I believe that we here in east Tennessee are blessed with the tools to solve these problems. The research expertise of the Oak Ridge National Laboratory in environmental, health, and safety is unique and we must see to it that it is utilized to the utmost.

Also, I am sure we can count on assistance from our good friend TVA. I believe the Oak Ridge citizens are genuinely concerned but not alarmed by these environmental problems. They are asking legitimate questions about the degree of threats to public health and safety and I am looking forward to the testimony from the Federal agencies, the State of Tennessee, and TVA, which has considerable experience with mercury contamination.

The three panels of witnesses afford us a spectrum of views and I believe that this will result in exploration of all major questions that need to be addressed.

I would like to acknowledge now the presence of Oak Ridge's new mayor, Mr. Roy Pruitt, who is in the audience. We welcome you, Mr. Mayor, and I am looking forward to a frank and open discourse with the witnesses.

Thank you, Chairman Gore.

Mr. Gore. Well, thank you. I am pleased to be invited to participate in these hearings as our two subcommittees this morning turn our attention to an issue of immediate importance to the Oak Ridge community, the release of 2.4 million pounds of mercury at the Y-12 plant during the 1950's and 1960's.

The one overriding threshold question in everyone's mind is whether there is any immediate threat to the health of the citizens of the area. At the outset of this hearing, I wish to say that our extensive investigation during the past 6 weeks, which included lengthy consultations with noted scientists including the leading mercury expert in the world from whom you will be hearing today, has not found any reason to believe that there is an imminent danger to the public health stemming from the mercury contamination at Oak Ridge.

The sparsely inhabited buffer area between the Y-12 plant and population centers, along with the tendency of mercury to move with sediments downstream, together appear to minimize the chance of the existing mercury contamination turning into a health problem. However, more data must be gathered and monitoring must be diligently performed.

The investigation has also confirmed that there are other problems such as the S-3 pond and the waste oil burial grounds, which if left unattended could become serious hazards. We cannot therefore responsibly stop our inquiry with mercury, but need to press further to see if necessary actions are being taken elsewhere.

As we listen to the witnesses today, we will be focusing on five questions. First, we need to further ascertain the extent of the mercury contamination and the potential for any long-term impact on the health and environment of Oak Ridge. We need to do this in order to develop and implement any necessary remedial action in time to prevent any further impact of mercury. Fortunately we have the time and expertise to undertake such activities, and it is my hope that steps to resolve this problem will be taken in an orderly, reasoned, and open fashion, involving the public, DOE, EPA, the State of Tennessee, TVA, and other interested parties.

Second, we need to understand, given the extent of knowledge about the mercury loss at Oak Ridge, at DOE, and UCMB since at least the mid-1970's, why no action was taken on this problem until late 1982 and 1983 when the matter became public because of a Freedom of Information Act request.

We need to examine the structure at DOE to understand why, given the knowledge and talents of the people involved and their responsibility to the public, why there was apparently a collective failure to notify the public. Our purpose is to learn from any mistake and look for new institutional arrangements that will prevent such a failure in the future.

Third, we need to know what is being done about the other problems, like the S-3 ponds and the waste oil burial grounds. We need to know what DOE is doing to gather data to assess the problems and to formulate and implement plans to comply with environmental laws. We know we are looking at many problems today that had their origins in another time when the Nation was primarily focused on national security and when environmental pollution and its health effects were not well understood. We know we are dealing with old facilities, but the laws and the times have changed and so must those facilities. Moreover, the Federal Government must accept responsibility for these changes immediately.

In our investigation we have become aware of many problems, but we have found none that are currently affecting human health. However, it is important and critical that we act quickly and responsibly.

Fourth, we seek to examine the positions of DOE, EPA, and the State to learn whether their institutional responsibilities under the hazardous waste and clean water laws conflict, and whether the responsibility of each agency needs to be more clearly defined before the business of protecting the health and environment can be accomplished. We also need to look further and see whether Federal facilities are legally subject to less stringent compliance than private facilities or whether those charged with carrying out the law have administratively decided not to hold Federal facilities to strict compliance with the law.

Last, we seek to learn how we can all work together to quickly and effectively solve these problems and put this matter behind us.

I look forward to the hearing and to the testimony today.

Mrs. **Lloyd**. Thank you very much, Mr. Gore.

Our first witness is Joseph La Grone, who is manager of the Oak Ridge Operations for the U.S. Department of Energy. Mr. La Grone, we welcome you to our committee hearing this morning, and would you state who is accompanying you?

Mr. **Gore**. Just a couple of brief ground rules. We are going to have a very long witness list today, an unusually long witness list, and we are going to ask all of our witnesses to hold their statements relatively short so that we can get through the hearing.

Second, since this is an investigative hearing, we are going to swear all witnesses. Do any of you have objection to being sworn?

Mr. **La Grone**. None whatsoever.

[Witnesses sworn.]

Mrs. **Lloyd**. Mr. La Grone, we welcome you today and look forward to your testimony. Will you identify the gentlemen who are accompanying you?

Mr. **La Grone**. I shall. I am accompanied to my left by Jim Foutch, who is Deputy Chief Counsel for Legal Services at the Oak Ridge Operations Office; to my right is Dr. William Bibb, who is Acting Assistant Manager for Environment and Safety at the operations office.

Mr. **Gore**. May I ask who else you have brought with you, Mr. La Grone? We have some questions for——

Mr. **La Grone**. In the audience is Mr. Herschel Hickman, who is Assistant Manager for Defense Programs, and I believe Mr. Jerry Wing, who is out of the environmental organization at Oak Ridge, is also in the audience.

Mr. **Gore**. Fine. At the appropriate time, we may have some questions for them and we will swear them at that time.

Mrs. Lloyd. Mr. La Grone, we have your prepared testimony. You may proceed as you wish or you may summarize and your entire text will be made part of the record.

Mr. La Grone.

Mr. La Grone. Thank you. I would like to offer the lengthy statement for the record, but I do have a summary which will run a few minutes, in an effort to try to lay the base line in terms of what has happened and where we are going.

Mrs. Lloyd. Thank you. Please proceed.

STATEMENTS OF JOSEPH La GRONE, MANAGER, OAK RIDGE OPERATIONS OFFICE, U.S. DEPARTMENT OF ENERGY, ACCOMPANIED BY JIM FOUTCH, DEPUTY CHIEF COUNSEL FOR LEGAL SERVICES, OAK RIDGE OPERATIONS OFFICE; AND DR. WILLIAM BIBB, ACTING ASSISTANT MANAGER FOR ENVIRONMENT AND SAFETY, OAK RIDGE OPERATIONS OFFICE

Mr. La Grone. Madam Chairman, Mr. Chairman, I am Joe La Grone, Manager of the Oak Ridge Operations Office. I assumed that position in April of this year.

As you know, on May 17, 1983, our office released a report entitled "Mercury Inventory at the Y-12 Plant 1950 through 1977." That report indicated spills and losses to the environment of about 650,000 pounds of mercury and almost 2 million pounds of mercury unaccounted for.

I want to take this opportunity to thank the committee for holding this hearing because we see it as a part of a total effort to get the information out, and get the facts out. That is the course we are on and have been working on here since April.

In terms of historical review, in the early 1950's, weapons tests confirmed the success of thermonuclear weapons utilizing lithium deuteride. The United States, therefore, launched a crash program to produce large quantities of enriched lithium. Y-12 was chosen as the production site. Two large-scale production facilities were completed and placed in operation during the period of December 1953 through September 1955.

The processes at Y-12 required large quantities of mercury. That was obtained from the General Services Administration under Presidential directives inasmuch as the AEC was to use those materials in the production of weapons for the common defense.

The lithium separation activity at the Y-12 plant was in two stages: development and pilot plant facilities in 1950 through 1955, and production facilities in 1953 through 1963.

In 1977, the Oak Ridge Office requested Union Carbide, the Y-12 operating contractor, to reconstruct the mercury inventory situation as it existed earlier at Y-12. This was done by two people in about 2 weeks, as I understand it. The report was classified as secret restricted data under the Atomic Energy Act of 1954, because some of that information pertained to the production of special nuclear materials for weapons.

In response to a Freedom of Information Act request in November 1982 by a local newspaper, the Appalachian Observer, for all reports on mercury spillages and emissions at Oak Ridge, a 1966 spill report was made available in late December 1982 and the 1977 report underwent declassification under the DOE's Freedom of Information Act regulations. That declassified report was released in May of this year and is included with my formal testimony. That report received broad distribution to local officials and to the news media.

In terms of some activities now, after my arrival at Oak Ridge in late April, I observed that environmental matters were receiving a great deal of attention, especially from the media and regulatory bodies. I learned that discussions were underway among Oak Ridge, EPA, and the Tennessee Department of Health and Environment, in particular about conditions at Y-12 which were believed to be out of compliance with State and Federal regulations and standards. I was also informed of the mercury situation, and the 1977 report that was undergoing declassification review. Based upon all of this, I felt that an additional focus, a greater amount of attention, was needed on environmental matters at Oak Ridge. Therefore, on May 9, 1983, I established a 12-member multidisciplinary Oak Ridge Environmental Task Group. The charter of this group was to learn as much as possible about the Y-12 mercury situation, discern what potential problems were present, and offer proposed solutions. At its inception, I informed the task group that once the mercury situation was under control, the group was to expand its problem spotting and solving activities to the entire Y-12 plant, and then expand its activities to other Oak Ridge facilities, and ultimately to those plants located in other States for which Oak Ridge is responsible.

One of the initial actions the task group took was to arrange for consultation with mercury expert Dr. Thomas Clarkson of the University of Rochester School of Medicine. He suggested sediment feeding studies that have been performed by the Oak Ridge Research Institute. In addition, I offered sampling for any citizen of Oak Ridge who has concerns about mercury contamination of his or her water, soil, air, or garden, and the task force has arranged for this sampling plus a more comprehensive sampling program of the Oak Ridge area.

Some of the other actions we have taken are reviewing information, findings, and actions with local organizations such as the chamber of commerce, the city council, and a group of Scarboro community citizens and residents. We are also making information available to the general public through a series of releases and have arranged with the Oak Ridge Public Library to have a file of information on current mercury data, which is updated as we develop more information and findings.

In addition to that, I have offered classified briefings to the Governor, to Members of Congress, and to State and local officials on the full text of the 1977 classified report.

Beyond that, we have contacted the National Center for Disease Control and requested their advice. We are pleased that the NCDC has agreed to have their experts review all our data, and we will be collecting any additional information that they ask us to do in an effort to determine what further actions or studies may be needed.

A question has been raised time and again about the 1977 report, "Why were not the unclassified portions of that report, such as the losses to the environment, made public in 1977?" I do not know the answer, but, because that question has not been answered, I directed our own Office of Performance Evaluation to begin an inquiry, and also specifically asked them to evaluate the numbers in the 1977 report to determine if they were appropriately stated or if there was additional information that would provide further information around those quantities. There are also other questions that have been raised about other reports that deal with mercury and documents and environmental matters coming out of the Oak Ridge office, and in this respect I have requested the Department of Energy's Office of Inspector General to conduct a full and complete investigation into all allegations of wrongdoing regarding these matters. I have directed that our own auditors' administrative inquiries will be in full support of the Inspector General's activities in determining exactly what happened. We do not have the answers yet, but I assure you that, if there is any wrongdoing identified, it will be dealt with promptly.

As to mercury accountability, the results of the efforts of our auditors in evaluating the 1977 report, as well as Union Carbide's separate review of those numbers, those are set forth in more detail in the prepared statement. The bottom line numbers stayed basically the same; about 2.5 million pounds of mercury were lost or are still accounted for. We have made some refinements in those figures and that is reflected on page 11 of my full statement.

One area where we still have a substantial range is the figure for creek losses, which may be only half as great as indicated in the 1977 report because doubling in the report may have been unnecessary. Because of the remaining uncertainty regarding the figure for creek losses, we express that in a range of 220,000 to 470,000 pounds. We will probably not be able to establish a firm figure, but we are sharing, and will share, this data with the interagency task force and hopefully it will help in the study of East Fork Poplar Creek.

Mercury discharges to the creek were significantly reduced in 1958 and 1959, as you will note in exhibit 2 to my prepared statement, and that happened because there were improved processes put in place with respect to purification. Another factor in decreasing mercury discharges to the creek was the construction of the New Hope Pond in 1963. Routinely about 2 ounces of mercury a day in 6 to 8 million gallons of water is discharged to East Fork Poplar Creek. In those instances where a pipe breaks, or in heavy storms, that amount goes up in ranges of between 2 and 3 percent—2 to 3 ounces, I should say, on a daily basis.

The revised estimate of all the spills from the pilot and production plants is about 425,000 pounds of mercury. This is a substantial upward revision—I say upward revision—of 150,000 to 225,000 pounds estimated in the 1977 report. Although there has been no evidence found to indicate interaction of the mercury spilled to the ground with any surface or ground water, other than by water line breaks which I will talk about later, we are at the beginning stages of a drilling program to identify any mercury contamination coming out of the ground water in the Y-12 area, and that involves a drilling program.

Summarizing the mercury accountability situation very briefly, our best estimate of mercury lost to the environment is about

715,000 to 965,000 pounds, mostly in the 1955 to 1958 timeframe, as contrasted with the 1977 report which projected 650,000 to 725,000 pounds.

Our current estimate of total material lost or unaccounted for is also in a range of 2 to 2.6 million pounds. If one subtracts the estimate of losses to the environment, the material-unaccounted-for figure is in a range of 1.1 to 1.9 million pounds. The 1977 report indicated 1.9 million pounds unaccounted for. Notwithstanding that some figures are still expressed in ranges, the figures are sufficiently large enough to be a cause for concern.

We have therefore concentrated our efforts on trying to determine: (1) how much mercury was lost to the environment, (2) what remains in the environment today, (3) what is the effect of the mercury in the environment, and (4) what should we do as responsible Federal servants to try to correct the situation. It is my belief that this information will help us and the interagency task group to determine the appropriate courses of future actions.

As to environmental sampling, monitoring has been performed in the upper reaches of the East Fork Poplar Creek since 1951. Included in my prepared statement as exhibit 3 is that data that is reflected since 1954. The supplement to that contains 1983 data.

I have also attached as exhibit 4 to my statement fish data for 1982 in East Fork Poplar Creek, Bear Creek, Poplar Creek, and the Clinch River.

As mentioned earlier, we have offered sampling services to concerned citizens, offers to sample soil, water, air, and gardens. The supplement contains data that arrived after my statement was finalized. These data confirm: (1) elevated levels of mercury in some soils and sediment, (2) no detectable mercury in air samples, (3) elevated levels of mercury only in water taken from East Fork Poplar Creek, not in wells, springs, or tributaries to that creek.

Turning to the other plants in the Oak Ridge area, there were also activities at about the same time period at the Laboratory and out at the gaseous diffusion plant which involved mercury, but in much smaller quantities. The total mercury involved at the Laboratory was around 150,000 to 200,000 pounds. That was obtained from Y-12. Operating personnel have estimated that about 2,000 to 3,000 pounds of that was lost due to spills and leakages, probably to the ground and around three buildings housing experiments.

Sampling in the area was recently performed. The details of that are set forth more fully on page 25 of my formal statement for the record.

At the diffusion plant, a small distillation unit was operated from 1948 through 1971. In the mid-1970's about 90,000 pounds—I am sorry, about 90,000 of the Y-12 mercury shipping flasks were cleaned at the diffusion plant and returned to Y-12 and in that process some quantities of mercury were discharged to Poplar Creek.

Operating personnel at the plant have estimated that about 1,500 pounds have been lost at the diffusion plant since 1948.

Based on all the presently available information, there appears to be a consensus of regulatory and scientific personnel that the concentrations of mercury found in air, water, soil, and sediment in the Oak Ridge area pose no immediate hazard to area residents.

The main health concern is consumption of fish. The State of Tennessee posted East Fork Poplar Creek in November 1982 against eating fish caught from that stream. We have assisted the State in its posting actions by fabricating and installing heavy metal signs that bear international symbols prohibiting fishing and swimming. The Interagency Task Force involving the State of Tennessee, EPA, and us will be examining potential for any long-term effects of mercury exposure from other than fish as a part of its analyses activities. And as I mentioned, the National Center for Disease Control will also be offering advice on what further actions may be appropriate.

We have just had completed two studies regarding mercury uptake. One experimental study was to research the biological significance of ingesting creek sediment. Dr. Revis of the Oak Ridge Research Institute will be addressing the results of that study. The other study, performed by Battelle Columbus Laboratories, was a pathways analysis for the hypothetical scenario of a garden contaminated with sediments dredged from East Fork Poplar Creek.

Because of indications that some material dredged by the city may have been taken without the city's knowledge and used on gardens as topsoil, we commissioned Battelle to do an uptake study under varying conservative hypothetical situations. We have no knowledge that any Oak Ridge citizen removed dredge material equivalent to even the minimum hypothetical amount, but our offer to sample still stands.

A synopsis of the Battelle results is set forth in my testimony for the record and these are, of course, hypothetical results. To try to obtain real-world data, we are looking for vegetables grown in the area. We have also been sampling garden soils. The first limited vegetable data is in and is set forth in exhibit 6. More recent data is included in the supplement to exhibit 6.

We expect that data will become more plentiful as the growing season progresses and vegetables become more plentiful. The garden soil samples appear in exhibit 5 and, of 21 garden samples so far, 4 show mercury above background levels.

Turning to the interagency agreement which was signed on May 26, 1983, I will not discuss that at this point in any detail since Mr. Zeller of the EPA and Dr. Bruner of the State will be speaking shortly. I will state that that agreement is a tough one for DOE, but it is a fair one.

I also have previously mentioned the task force will study contamination in East Fork Poplar Creek and Bear Creek. This study is not limited to mercury, but includes potential contamination by plutonium, uranium, thorium, beryllium, PCB's, and lead.

One of the most troublesome problems at Y-12 mentioned in the agreement is the S-3 ponds. Since 1951, these four 1-acre ponds have been receiving nitric acid wastes contaminated with low-level enriched uranium as well as other substances.

We are discussing with EPA and the State, methods of handling those materials on an interim basis. The long-term solution, however, is construction of the central pollution control facility, which would process all of the effluents presently going into the ponds. We hope to award a fixed-price construction contract for this facility by this fall, and have established that funding is available for the project in fiscal year 1983 and 1984. That is through a series of internal reprograming actions, as well as the $1 million included in the conference report for fiscal year 1984. The expected completion date is the fall of 1986.

We are also currently involved in internal activities designed to eliminate the continuing discharges of approximately 2 ounces of mercury per day to East Fork Poplar Creek. We expect to complete a drain line cleanup program this summer, and also the mercury in New Hope Pond will be removed when we clean it out in 1984 or 1985.

Two weeks ago a water pipe burst, causing about a million gallons of water to enter New Hope Pond with an estimated 1 to 3 pounds of mercury picked up under the process buildings. This has caused us to concentrate additional attention on the aged piping under those process buildings. And, although a restoration projection was already underway to replace certain water pipes, we are now reviewing the need for additional pipe replacement.

The three DOE plants in Oak Ridge have consistently operated within radiation standards. The 1982 calculation is a maximum exposure of about 1 percent of the present allowable standard.

As I discuss more fully in my testimony for the record, Y-12 may have a problem meeting the recently proposed national emission standard for radionuclides. We are discussing the proposed standard and will be in further discussions on the Y-12 modeling with the EPA.

As to PCB's, because Oak Ridge plants have used huge electric motors for four decades, and because until recent years transformers serving electrical equipment used PCB's, we have a large volume of radioactively contaminated PCB's. An EPA-approved PCB incinerator that will be able to safely and almost totally destroy PCB's and other organic chemicals is scheduled for completion in 1988.

Looking at the laboratory environmental situation for just a moment, there are some specific problems. Solid radioactive wastes from the lab and from other Eastern U.S. nuclear sites have been disposed of in shallow trenches in six low level solid radioactive waste burial grounds at that site. Many of the old basins, pits, and trenches seep to ground water in the laboratory area. While the effluents meet applicable standards at White Oak Dam, we have a continuing effort to improve radioactive waste operations.

The sewage plant at the laboratory is very old and outdated and a source of continual violations of the NPDES permit. We have a $1.4 million project authorized for fiscal year 1984 which I believe will correct this problem.

Runoff from the laboratory coal storage area currently exceeds EPA standards. Some corrective actions have already been taken and these will be completed in fiscal year 1984.

As to the diffusion plant, we believe that most of the major environmental concerns have been resolved, but some problems are still being worked. Sediments in two ponds present a disposal problem, but there will be a fiscal year 1985 project to fix these sediments in concrete for proper disposal. Monitoring wells in the area of the ponds thus far show no evidence of leakage.

During past operations at the diffusion plant, quantities of uranium were discharged to Poplar Creek and were measured by routine sampling. Some PCB's were probably also discharged, in addition to mercury. It is planned that the Interagency Task Force will consider these contaminants.

Although the NPDES permits for the diffusion plant expired in 1980, they were extended by EPA, pending renewal. Requests for renewal have been submitted, along with considerable sampling data.

This admittedly is an extremely abbreviated overview of the environmental situation at Oak Ridge operations, but if two things come through loud and clear today from my presentation, I hope it will be these: First, because of the age of its facilities and its history of being on the forefront of national security activities, Oak Ridge today has some environmental problems. Second, we cannot stand by that, however, we are now in 1983 and we are working diligently, with openness and candor, to identify and control those problems and to bring our facilities into compliance with applicable standards.

With the continued assistance of the Environmental Protection Agency, the Tennessee Department of Health and Environment, the city of Oak Ridge, the fine citizens of this area, and the Members of Congress, I believe we will be successful in those endeavors. To that I pledge cooperation and collaboration.

That completes my statement. I will be glad to answer any questions that you have.

[The prepared statement of Mr. La Grone follows:]

House Science and Technology Committee
July 11, 1983
Witness: Joe La Grone
Page 25, Line 612

STATEMENT OF JOE LA GRONE
MANAGER, OAK RIDGE OPERATIONS,
U. S. DEPARTMENT OF ENERGY,
BEFORE THE SUBCOMMITTEES
ON ENERGY RESEARCH AND PRODUCTION
AND OVERSIGHT AND INVESTIGATION
OF THE HOUSE COMMITTEE ON
SCIENCE AND TECHNOLOGY

OAK RIDGE, TENNESSEE
JULY 11, 1983

STATEMENT BY
JOE LA GRONE, MANAGER
OAK RIDGE OPERATIONS OFFICE
U. S. DEPARTMENT OF ENERGY

Mr. Chairman and members of the Committee:

My name is Joe La Grone. Since April of this year, I have been Manager of the Oak Ridge Operations Office of DOE. I have been with DOE and its predecessor agencies, the Atomic Energy Commission and the Energy Research and Development Administration, for the past 20 years, the last five of which I served as Manager of the San Francisco Operations Office.

As you know, on May 17, 1983, Oak Ridge Operations Office released a report entitled "Mercury Inventory at Y-12 Plant 1950 through 1977." This ten-page report indicated that more than 475,000 pounds of mercury had been lost to a local creek; that between 150,000 and 225,000 pounds of mercury had been lost to the earth; that 30,000 pounds had been lost to the air; and that 1,880,699 pounds of mercury were still unaccounted for in 1977. Release of this information, naturally, resulted in a lot of concern and questions from the media, state and federal regulatory bodies and local citizens.

I would like to take this opportunity to thank you for holding these proceedings, and providing further opportunity to discuss this matter. I believe that one of the most important steps in solving any problem is getting the facts out on the table where everyone can examine them. The proceedings today should be a great help in the process of bringing out all the facts about the mercury situation and other environmental concerns at DOE's Oak Ridge facilities.

In beginning a discussion of the mercury inventory situation at the Y-12 Plant, it's useful to recall the circumstances surrounding the large-scale lithium separation process at Y-12 between 1950 and 1963.

HISTORICAL REVIEW

Lithium enriched in the lithium-6 isotope is used in the production of lithium deuteride fuel for thermonuclear weapons. In the early 1950's, weapons tests confirmed the success of thermonuclear weapons utilizing lithium deuteride. The United States, therefore, launched a crash program to produce large quantities of enriched lithium. The Oak Ridge Y-12 Plant was chosen as the production site and two large scale production facilities were completed and placed in operation during the period of December 1953 through September 1955. That these facilities were completed in the remarkably short time of less than two years reflects the fact that they were constructed because of strong national security concerns regarding thermonuclear weapons.

The lithium separation processes used at Y-12 required large quantities of mercury. Photographs 1 through 3 show process equipment. The mercury was obtained from the General Services Administration (GSA) under a series of Presidential directives to the Director of the Office of Defense Mobilization, stating the mercury was for use by the AEC in the production of weapons for the common defense. The mercury was shipped to Y-12 from the GSA stockpile and other sources in flasks nominally containing 76 pounds of mercury. Due to the high priority of getting the facilities in operation, the incoming mercury was added directly into process equipment upon receipt, with no measurement of the contents of the flasks. Photographs 4 and 5 show how the flasks were received and the emptying operation.

The lithium separation activity at the Y-12 Plant was in two stages: (1) development and pilot plant facilities, and (2) production facilities. Development and pilot plant facilities were operated in four buildings at Y-12 from 1950 through 1955. By the end of 1955, production facilities were in operation and all development and pilot plant operations at Y-12 were shut down. Stripping and decontamination of the development and pilot plant facilities was completed by mid-1958.

Large scale production facilities were operated for lithium separation at Y-12 during the period of 1953 through 1963. These production plants were operated as follows:

- BETA-4 plant began operation in August 1953. It was shut down and placed in standby in February 1956.

- ALPHA-4 plant began operation in June 1955. It was shut down and placed in standby in December 1962.

- ALPHA-5 plant operated from January 1955 through March 1959. It was in standby from March 1959 to December 1962, when it was placed in partial operation through May 1963 for the purpose of producing lithium-7 for the agency's reactor development program. After this six-month effort, it was shut down and again placed in standby.

After the production plants were placed in standby, decontamination activities were initiated.

- The mercury was removed from the BETA-4 production plant in 1956, and stripping and decontamination was completed in 1957.

- The ALPHA-5 production plant was drained, stripped and decontaminated in 1965 and 1966.

- All mercury was drained from the ALPHA-4 production plant and the equipment was flushed by 1977. The process equipment is still in place, though it has not operated since December 1962.

1977 REPORT

In 1977, ORO requested the Y-12 operating contractor, Union Carbide Corporation, to try to reconstruct the mercury inventory situation as it had existed at Y-12 in earlier times. We have not been able to determine why the inventory reconstruction was requested. Two contractor employees spent two weeks gathering what information they could, sometimes from documents, sometimes from personal recollections of employees who had worked in the lithium separation program. The result of their efforts was the previously mentioned report titled "Mercury Inventory at Y-12 Plant 1950 through 1977," which showed spills and losses to the environment of about 650,000 pounds of mercury, and about 1.9 million pounds unaccounted for. The report was classified as Secret Restricted Data under the Atomic Energy Act of 1954, as amended, because some of the information pertained to the production of special nuclear materials for nuclear weapons.

In October 1982, during a meeting between representatives of the Tennessee Department of Health and Environment and ORO regarding surface and groundwater conditions around Y-12, the matter of mercury in East Fork Poplar Creek was discussed. In response to a general question regarding whether there were any ORO documents that discussed mercury losses, the general answer was given that, if there were, they were likely to be classified. The matter was not pursued by either party, but, in a later newspaper interview, a TDHE representative mentioned the classified reports on mercury.

These references to classified reports apparently prompted a Freedom of Information Act request by a local newspaper, The Appalachian Observer, in November 1982 for all reports on mercury spillages and emissions at ORO. The only responsive documents identified were the 1977 Report and an investigative report done at the time of a 1966 spill. The 1966 document was made available to The Appalachian Observer in late December 1982, and the 1977 document underwent the declassification review process required by DOE's regulations implementing the Freedom of Information Act. It was released in May of this year, after identification and deletion of the Secret Restricted Data. Simultaneously with our release of the 1977 Report to the requesting newspaper, we furnished the report to the State, EPA, the City of Oak Ridge and other local media. The 1966 spill had received media attention in the year of the spill, so no further action was taken on that report. A copy of the unclassified version of the 1977 Report is attached as Exhibit 1 to my testimony.

After my arrival in Oak Ridge in late April, I observed that environmental matters were receiving a great deal of attention, particularly from the media and regulatory bodies. I learned that discussions were underway among ORO, EPA and the Tennessee Department of Health and Environment regarding conditions at the Y-12 Plant that were believed to be out of compliance with state and federal regulations and standards. I was informed of the mercury situation, and the 1977 Report that was undergoing declassification review. Based on all of this, I felt that an additional focus, a greater concentration, was needed on environmental matters at ORO. Therefore, on May 9, 1983, I established a 12-member multidisciplinary ORO Environmental Task Group. The charter of this group was to learn as much as possible about the Y-12 mercury situation, discern what potential problems were present and offer proposed solutions. At its inception, I informed the Task Group that, once the mercury situation was under control, the group was to expand its problem spotting and solving activities to the entire Y-12 Plant, then the other Oak Ridge facilities, and then to the plants located in other states that are under ORO responsibility.

The Task Group has been very active, and it is this group that has formulated or implemented many of the mercury-related activities of ORO during the past month and one-half. For instance, the Task Group arranged for the consultation with mercury expert Dr. Thomas Clarkson, a Ph.D., professor and head of the Division of Toxicology and Director of Environmental Health Sciences at the University of Rochester School of Medicine. The Task Group also suggested the sediment feeding studies that have been performed by the Oak Ridge Research Institute, which I will discuss later. I offered sampling for any citizen of Oak Ridge who had concerns about mercury contamination of his or her water, soil, air or garden, and the Task Force has arranged for this sampling, plus a more comprehensive sampling program of Oak Ridge areas not studied before or for parameters not previously studied in these particular areas, such as radioactivity and PCB's. In addition, the Task Group has directed the preliminary steps for a well-drilling program to locate, if possible, pockets of mercury resulting from spills at the Y-12 Plant and to identify any contamination of area groundwater by mercury. Some members of the Task Group are also participating in the Interagency Task Force established under the Memorandum of Understanding we executed with the State and EPA, which I'll discuss in more detail later.

Some of the actions that I and my staff have taken, independent of the Task Group, are reviewing information, findings and actions with local organizations, such as the Oak Ridge City Council, the Oak Ridge Chamber of Commerce and a group of Scarboro community residents, about the 1977 Report and our subsequent sampling data. I also offered to appropriate City, State and Federal officials, as well as the U. S. Senators and Representatives from this area, briefings on the 1977 Report in its full text, so they would have the complete picture of the Y-12 mercury inventory situation.

We have also contacted the National Center for Disease Control, and requested their advice on additional steps which we should undertake with regard to the mercury in the environment in the Oak Ridge area. We are pleased that NCDC has agreed to have their experts review all our data and we will be collecting any additional data they may request to aid them in determining what further actions or studies by DOE or NCDC may be appropriate.

A question that has been raised time and again about the 1977 Report is "Why weren't the unclassified portions of the report, such as the losses to the environment, made public in 1977?" I don't know the answer, but--because that question hasn't been answered--and because questions have been raised about other documents and activities related to mercury, shortly after release of the 1977 Report I directed auditors from ORO's Office of Performance Evaluation to begin an inquiry into these matters. I specifically asked for the auditors to evaluate the numbers in the 1977 Report, and I will give you the results of that evaluation a little later. There are other 1977 and post-1977 reports and activities that I have asked the auditors to look into: the Elwood Report, information furnished other agencies (including TVA) in this time period, two ORO environmental assessments issued subsequent to the 1977 Report, and the Steven Gough matter. I requested DOE's Office of Inspector General to conduct a full and complete investigation into all allegations of wrongdoing regarding these matters, and I have directed that the Office of Performance Evaluation's administrative inquiry shall be in support of the IG's investigation. We don't have all the answers yet, but we are looking. As a part of this, we're trying to determine why things happened the way they did, and we are actively seeking information and answers. If there is any wrongdoing identified, it will be dealt with promptly.

Information that we develop will be made available to the public on these topics, as well as the sampling data, results of studies, new expert opinions, etc. In that regard, I'll mention one of the steps we've taken to assure public access to mercury information. With the cooperation of the Oak Ridge Public Library, we placed a package of basic mercury materials in the library, which we've been supplementing with new information as it has become available. When sampling data, analyses, reports and similar information is furnished to EPA and the Tennessee Department of Health and Environment, we also furnish it to the City of Oak Ridge and place a copy in the library. In this manner, the citizens of Oak Ridge can have prompt access to all the information to which the media and public officials are referring.

MERCURY ACCOUNTABILITY

As I mentioned earlier, I asked members of ORO's Office of Performance Evaluation to conduct, to the extent possible, an audit verification of the figures contained in the report. In addition, Union Carbide Corporation has conducted a separate review of all available information from the records it maintains. Since we and Union Carbide are trying to recreate events of some 20 years ago, from a time when records are less complete than we would like, the results are still far from exact. We have, however, been able to refine the figures, setting ranges in some cases, establishing confidence factors in others and identifying what may be a basic error in one instance.

The following information is based on page 5 of the 1977 Report. It shows the data in the original report and the more refined figures based on the past two months of activity.

	1977	1983
Measured loss, 9201-5, March 1966	49,853	49,853
Other Spill losses (estimated)	*	375,000
Creek losses through 1972 (soluble)	235,000	(243,444 - 470,000 total
Creek losses through 1964 (entrained, estimated)	235,000	
Mercury in sludge removed from New Hope Pond - 1972	7,200	6,629
Airborne losses 1955-1963	30,000	51,300
Mercury in New Hope Pond 1973-1983		8,475
Total mercury unaccounted for	1,880,699	1,539,863 - 1,766,419
Total mercury lost or unaccounted for	2,437,752	2,501,120

*Estimated spill losses were not considered accounted for in the 1977 Report.

What these figures indicate is that, while the bottom line numbers stay basically the same, in that about 2.5 million pounds of mercury were lost or are still unaccounted for, we believe we have a more precise figure on the quantities of mercury that we now consider accounted for. Part of the increase in material accounted for occurs in categories where figures are still classified. A substantial addition to accounted for material is the result of including spill quantities, which should have been considered accounted for in the original report but were not. This figure

(375,000 pounds), therefore, appears as a separate 1983 column entry and results in a reduction in the entry for "Total mercury unaccounted for."

Airborne losses, it will be noted, are estimated to be 75 percent higher than previously reported. The 1977 Report failed to consider three other sources of airborne losses, BETA-4 smelting losses of 5,000 pounds, BETA-4 stack losses of 8,300 pounds, and an additional estimated 8,000 pounds from ALPHA-4 and ALPHA-5.

One area where we still have a substantial range is the figure for creek losses, in that creek losses may be only half as great as indicated in the 1977 Report. Footnote 8, on page 5, of the 1977 Report states, with regard to entrained mercury losses to the creek: "No analysis available on entrained material. Estimated to be equal to soluble mercury." The 1977 Report, therefore, doubled the measured amount of mercury to account for what was presumed to be the unmeasured insoluble material. Those involved in the analysis of mercury in Y-12 samples during this period state, however, that the entrained material was, in fact, measured for all except 2.5 years in the mid-1970's, when creek losses were very low. If this is an accurate statement, the doubling in the 1977 Report for creek losses was unnecessary.

The 243,444 figure shown as the low end of the range is made up of the following components:

Discharges to Creek (soluble and insoluble suspended)	218,869
Metallic mercury and bottom sludges (before New Hope Pond)	7,500
Storm flow losses	1,275
1950-1955 -- all other losses (estimated)	15,800
	243,444

A confidence factor of 24,000 pounds has been ascribed to the "discharges to the creek" figure, plus or minus, so the low figure range is approximately 220,000 to 268,000 pounds. Because of the remaining uncertainties with regard to the figure, we consider the range to be 220,000 pounds to 470,000 pounds. Even with our continuing audit activity, we will probably not be able to establish a firm figure. We will, however, share this information about uncertainty regarding losses to the creek with the Task Force under the MOU, since it may be of help to that group in its study of East Fork Poplar Creek.

I've been talking about creek losses, a term that is used in the 1977 Report, and that's really a misnomer. While the mercury was lost from the separation process, the term I used earlier, "discharges to the creek," is more descriptive of what occurred because the bulk of the creek figure is made up of mercury discharged to the creek as a normal part of the separation activity from 1955 to 1958. The mercury used in the lithium separation process was on 100% recycle. Impurities that collected in the mercury during processing were detrimental to the operation, so the mercury had to be purified periodically. Initially, during the 1956-1958 time period, purification was accomplished with a wash solution of water and nitric acid. The solution was initially 5 percent nitric acid, which was later lowered to 3 percent. The acid dissolved the impurities, as well as some mercury. The purified mercury was returned to the process, and the wash solution (including the suspended quantities of dissolved mercury) went to a holding tank within the building, which pumped to a sump outside, which emptied into Upper East Fork Poplar Creek. Since production quantities of mercury were used in the process, significant quantities of mercury were transported to the creek by means of this cleaning operation from August 1956 through June 1958. Mercury discharges to the creek from this source were essentially eliminated when the nitric acid wash purification procedure was abandoned in 1958 and 1959 in favor of a water and air procedure that oxidized the undesirable impurities. The water utilized in this procedure was filtered and reused. This decrease in mercury discharges is depicted graphically on Exhibit 2, "Mercury Losses to East Fork Poplar Creek."

Another factor in decreased mercury discharges to the creek was the construction of New Hope Pond in 1963. The intention of the pond was to provide a gathering basin where discharges from the plant could be collected in order to smooth out the fluctuations in the acidity and alkalinity of the plant's discharges. For this reason, a discharge system to feed the pond was developed, which allowed for multiple inlets and improved the mixing of the storm sewer and plant effluent material. The pond accomplished its intended purpose almost immediately, and the quality of the water discharged from New Hope Pond into East Fork Poplar Creek was improved noticeably. A secondary benefit was that insoluble mercury (both in suspended material and as a metallic material discharged from the plant) was also retained by New Hope Pond and was allowed to settle out. Since New Hope Pond was placed in operation in 1963, analyses indicate that 15,000 pounds of mercury have been retained in the sediments. About 6,500 pounds of this material was dredged out in 1972 and placed in a dry retention basin on top of Chesnut Ridge. The other approximately 8,500 pounds remains in the pond and will be disposed of when the pond is cleaned out. We submitted plans for cleaning out New Hope Pond to the State and EPA on July 1. We expect the work to be completed in the 1984-1985 time period.

SPILLS

Whereas most of the mercury discharges to the creek were the result of the process procedure, a larger quantity of material was lost through spills to the ground during mercury operations at Y-12. During our recent data gathering activities, we have found additional information that causes us to increase the spill quantities set forth on pages 8 and 9 of the 1977 Report. In addition to getting a better grasp on the magnitude of the losses, we have determined that there are additional spills that should be included, and that one of the dates was wrong by more than a year.

Before talking times and amounts, it may be helpful to discuss procedures for spill control. The operation of the lithium production plants involved the pumping of tremendous volumes of lithium-mercury amalgam. This required the development and operation of pumps of a type that were being used for the first time. Small leaks and spillages of mercury and amalgam were common, and the high rate of equipment failures and attendant maintenance problems increased the spillage of these mercury materials. The production buildings, therefore, were designed with a collection system to allow the mercury that spilled onto the floor to go into the building's drain system, and then to be trapped in tanks on the lower levels of the building. This collection occurred before the wash waters were drained to the outside sumps, and then to the environment. Notwithstanding these protective measures, there were a number of accidental spills to the ground during the course of the operations.

In addition to the five spills that are referred to in the 1977 Report for the production plants, we should include a figure for losses from the pilot plants, which operated from 1950 through 1955. We believe there were three spills at these plants during that time, with an estimated total spill quantity of 100,000 to 120,000 pounds, and an estimated loss after recovery operations of 95,000 pounds. The spills were the result of a ruptured valve, a split pipe and a failed pump. In each instance, the spilled mercury seeped through the floor into the dirt basement. Recovery operations were largely unsuccessful because the mercury kept running deeper into the ground during the excavation operation.

With regard to the production plant spills, our additional data gathering has yielded the following information:

Date	Location	Estimated Quantity Spilled (lbs)	Estimated Unrecovered Loss (lbs)
Jan. 1, 1956 (Not 12/31/55)	9201-5 (Alpha 5)	113,000 - 170,000	70,000
July 17, 1956	Ramp North of 9201-5	22,500 - 90,000	85,000
Summer 1956	Between 9204-4 (Beta 4) and 9201-5	22,500 - 90,000	85,000
Nov. 15, 1956 (Not Summer 1955)	9201-5	22,500 - 45,000	40,000
Mar. 28, 1966	9201-5	105,000	49,853
Total		285,000 - 500,000	329,853

Adding the production plant spill estimate of 329,853 pounds to the pilot plant spill estimate of 95,000 pounds I just discussed, the total of all spills at the pilot and production plants is estimated to be 424,853 pounds of mercury. This is a substantial upward revision of the 150,000 to 225,000 pounds estimate of the sum of unrecovered mercury that appears on page 10 of the 1977 Report.

The natural question, when faced with an estimated spill loss this large, is "Where did it go?" Based on presently available information--and I stress "presently available" because of the information gathering activities that we are going to be engaged in over the coming months--it appears that the bulk of the spilled mercury that was not recovered is deposited in the ground beneath Y-12. I am informed that the physical and chemical properties of mercury--an element 13.6 times heavier than water, and a very mobile liquid between the temperature ranges of -38.87°C to 356.72°C (-37.97°F to 674.10°F)--make its pathway in the ground difficult to trace and its recovery impractical in the Y-12 geological formation. This formation consists of fractured, cavernous shales and limestones of the Conasauga group, found throughout East Tennessee. The most probable location of mercury accumulations is in permeable zones in the fill and open fractures in bedrock. In this formation, big holes abound that dip downward at about a 30° angle, resulting in gravity transport of any liquid. These holes are difficult to locate, even by intersectional drilling. Mercury from this source is reported to be quite unlikely to find its way into East Fork Poplar Creek or another waterway. There has been no evidence found to indicate interaction of the mercury spilled to the ground with any surface or groundwater, other than as the result of a recent water line break that I'll discuss later. We are, however, continuing to study the situation and are at the beginning stages of a drilling program to identify any mercury accumulations and any mercury contamination of groundwater in the Y-12 area.

SUMMARY OF MERCURY ACCOUNTABILITY

Before proceeding to what we are doing about the mercury situation today, let's recap where we are from the standpoint of the amount of mercury about which we're talking. The total amount of mercury used in the process is still classified, for national security reasons, but we know there were spills, discharges, losses and what is identified in the report as "material unaccounted for."

The 1977 Report estimates that 2.4 million pounds of mercury has either been lost or is unaccounted for. As we discussed earlier, we believe a better estimate of losses, discharges and spills (in round figures) is as follows:

Lost to Air	51,300
Discharged to Creek	220,000 - 470,000
Lost to New Hope Pond	15,100
Spills	425,000
Total	711,400 - 961,400

To this should be added approximately 3,000 pounds for losses from Building 81-10, discussed on page 8 of the 1977 Report. This brings the total to 714,400 - 964,400 pounds of mercury estimated to have been lost to the environment, primarily in the 1955-1958 time period, as contrasted with the approximately 650,000 - 725,000 pounds estimated in the 1977 Report.

Using the 2.4 million pounds figure from the 1977 Report, subtracting the estimated losses to the environment leaves a balance of 1.5 - 1.7 million pounds unaccounted for. The 2.4 million pounds, however, is troublesome as a starting point because, it will be recalled, we are not certain how much mercury was received from GSA because, as best we can determine, the mercury was never weighed. The DOE audit verification indicated that a range would better reflect the uncertainty surrounding this value. ORO's current estimate of total material lost or unaccounted for is 2.0 million to 2.6 million pounds, which means that, after subtracting losses to the environment, the material unaccounted for figure is in the range of 1.1 to 1.9 million pounds.

My charge to the DOE auditors in beginning their task was to independently review and verify all available mercury accountability information, to satisfy themselves that the figures are as accurate as DOE can obtain. They have done this, but some of the figures must continue to be expressed in ranges.

In short, though, we will probably never be able to account for all the Y-12 mercury inventory--if, for no other reason, because we are not certain how much was received at Y-12 and there is no real way to improve on our estimates. This uncertainty must, for the present, remain as an open question. Perhaps the activities of the Interagency Task Force under the MOU, or the other activities of ORO that are continuing, will eventually develop data that will help reduce the accountability uncertainties. In any event, the figures are sufficiently large to be a cause for concern. Because of our concern for the environment and the public health, ORO has concentrated its efforts on determining how much mercury was lost to the environment, what remains in the environment today and what is the effect of the mercury in the environment. This information will help us determine what actions are appropriate in response to the present situation.

ENVIRONMENTAL SAMPLING

One of the primary ways of determining what was released to particular parts of the environment, and what its potential effects are, is through environmental sampling.

To address the concern that local citizens rightfully have had about the mercury situation, for the past six weeks we have responded to citizen requests made to the City of Oak Ridge for soil, water, air and garden samples. We have also expanded our environmental monitoring program for mercury and other potentially hazardous substances in the Oak Ridge area. Before addressing the new sampling data, it may be helpful to look at the historical data.

With regard to East Fork Poplar Creek, which flows from the Y-12 Plant for approximately 20 miles to its juncture with Poplar Creek, and then to the Clinch River, we have performed mercury sampling over roughly the last decade in sediment and fish. Water sampling activities extend back to the mid-1950's. DOE first became aware of the presence of mercury in the sediments of East Fork Poplar Creek, and thereby the potential for uptake by fish, in the summer of 1974. Pursuant to a creek study plan, DOE gathered samples that showed elevated levels of mercury, as well as the expected elevated levels of uranium, thorium and PCB's. Fish sampling by Union Carbide in May, June, July and October 1976 showed elevated levels of mercury in some fish. The fish data was shared with TVA and the State of Tennessee in May of 1977. We have also shared subsequent supplementary fish and sediment data. As I indicated in my earlier testimony, questions have been raised about the amount of information we furnished other agencies in this time period. Our continuing inquiry is examining whether information was withheld from other agencies.

The elevated levels of mercury in sediment and fish are believed to be the result primarily of the 1955-1958 discharges to East Fork Poplar Creek, which are believed to have deposited mercury into sediment along the full length of the creek bed and into the Clinch River. The portion of the mercury that was in insoluble form would have tended to settle out in nearby portions of the creek as well as moving further downstream, while the soluble form would be expected to have moved further downstream. Monitoring has been performed in the upper reaches of East Fork Poplar Creek since 1951. A monitoring station has existed at the outfall from New Hope Pond to East Fork Poplar Creek since it was constructed in 1963. I have included in my testimony as Exhibit 3 the mercury data generated by these monitoring activities since 1954.

Some representative sampling results for East Fork Poplar Creek and the Clinch River are:

Sediment (Background in local streams is 0.3 ppm, on average)

Highest Sediment	480 ppm (Off Illinois, near Turnpike)
East Fork Poplar Creek (close to Clinch)	19 ppm
Poplar Creek	51 ppm
Clinch River	7.8 - 18.5 ppm

Water (The Tennessee Stream Guideline is 0.05 ppb unfiltered for fish and aquatic life. The EPA National Interim Primary Drinking Water Standard is 2 ppb filtered.)

Outfall New Hope Pond (Y-12)	3 ppb Unfiltered
	1 ppb Filtered
Poplar Creek (near Clinch)	1 ppb Unfiltered

Fish (The EPA Guideline is 1 ppm in edible tissue.)

Blue Gill - Near Plant	2.13 ppm
- Close to Clinch	0.50 ppm
- Clinch	0.50 ppm

I have attached as Exhibit 4 to my testimony 1982 fish data for East Fork Poplar Creek, Bear Creek, Poplar Creek and the Clinch River.

Additional sediment, surface water, air and soil sampling in the Oak Ridge area in the last two months has yielded additional data, which I have attached as Exhibit 5 to my testimony. These data confirm elevated levels of mercury in some soils and sediment, no detectable mercury in air samples, and elevated levels of mercury only in water taken from East Fork Poplar Creek, not in wells, springs or tributaries to the creek.

With regard to whether the sampling data show violations of environmental standards or guidelines, there are no state or federal soil or sediment standards, per se. Air sampling data from the world's largest mercury mine in Almaden, Spain, and a former chlor-alkali plant in Virginia suggest no basis for assuming any Oak Ridge City area has the potential to exceed the Environmental

Protection Agency suggested guideline for ambient air. Air tested at Robertsville Junior High School, an area where one would expect dust to be kicked up, yielded no detectable airborne mercury. While the surface waters tested do not meet the present Tennessee Stream Guideline for protection of aquatic life, which has been reduced from 5 ppb to 0.05 ppb maximum mercury concentration over the past decade, it is hoped that our mercury cleanup activities within the plant and in New Hope Pond will bring the stream level down to the present Tennessee Stream Guideline. The surface waters do meet the EPA National Interim Primary Drinking Water Standard. Some of the fish sampled exceed the FDA action guideline for mercury in fish and, as I'll discuss later, appropriate actions have been taken.

MERCURY AT OTHER ORO PLANTS

In addition to the activities at Y-12 involving mercury, there were activities at about the same time period at the Oak Ridge National Laboratory and the Oak Ridge Gaseous Diffusion Plant that also involved mercury, though in much smaller quantities.

At the Oak Ridge National Laboratory, a small pilot plant supporting the OREX lithium separation process was operated from April until November of 1954 in support of the Y-12 weapons program. This pilot plant was located in ORNL Building 4501. At about the same time, component development work on the OREX process was conducted in ORNL Building 3592 for several months. In the early 1960's, there was also a small research and development effort in

ORNL Building 3503 in support of the fission reactor fuel reprocessing program that used a small amount of mercury.

The total mercury involved at ORNL was approximately 150,000-200,000 pounds and was obtained from the Y-12 inventory. There is no accurate measure of mercury loss at ORNL but operating personnel have estimated that a total of approximately 2,000-3,000 pounds was lost due to spills and leakage. This material is believed to have found its way to the ground under and around the three buildings housing the experiments.

Because of information showing mercury spills at ORNL, sampling was recently performed. The samples showed mercury in sediment values in White Oak Creek of up to 19 ppm, and up to 3.3 ppm in sediment in White Oak Lake. Levels in soil at ORNL range up to 320 ppm around buildings that once processed mercury. Available data, however, indicate that fish in the Clinch River at the mouth of White Oak Creek do not exceed the FDA action guideline for fish of 1.0 ppm. We are continuing to monitor the situation.

At the Oak Ridge Gaseous Diffusion Plant, a small distillation unit was operated from 1948 until 1971 to prepare pure instrument grade mercury. This process involved the purification of several hundred pounds of mercury per month. In the purification process, small quantities of mercury were discharged to a holding pond prior to discharge to Poplar Creek. In 1973, the holding pond was dredged and the mercury contaminated sludge placed in a holding pond without an outfall.

In the mid-60's approximately 90,000 of the Y-12 mercury shipping flasks were cleaned at ORGDP for return to Y-12. The flasks were subsequently used to drain Y-12 process equipment. During the cleaning process, small quantities of mercury were discharged to Poplar Creek.

There is no accurate measure of mercury process losses at ORGDP prior to 1971, but operating personnel have estimated that a total of approximately 1,500 pounds have been lost since 1948, with most of the losses occurring in the 1948-1971 time period.

CONCLUSION BASED ON MERCURY SAMPLING

Based on all the available information, there appears to be a consensus of regulatory and scientific personnel that the concentrations of mercury found in air, water, soil and sediment in the Oak Ridge area pose no immediate hazard to area residents. The main health concern is consumption of fish, which has been addressed by State activity. As a protective measure, the State of Tennessee posted East Fork Poplar Creek in November 1982 against eating fish caught there, based on data DOE furnished that showed mercury concentrations in some fish in the upper regions of the creek exceeded current Food and Drug Administration guidelines. We have assisted the State in its posting action by fabricating permanent metal signs with international symbols, based on a design provided by the State, that warn against fishing or swimming in East Fork Poplar Creek. Although we are of the opinion that only fish consumption is an immediate health concern based on available information, we are pleased to cooperate with the State in this conservative approach to the situation. The Interagency Task Force established under the MOU will be examining the potential for any long-term effects of exposure other than from fish as a part of its analyses activities, and we will be participating in that study. As I mentioned earliar, we are pleased that the National Center for Disease Control will be offering advice on what further actions may be appropriate.

CURRENT AND PLANNED ACTIVITY

We have underway, or planned for the near future, activities that will enable us to continue assessing the Y-12 mercury situation or move toward its resolution.

We have just had completed two studies regarding mercury uptake. One experimental study, by the Oak Ridge Research Institute, was to research the biological significance of ingested creek sediment. Since Dr. Revis will be speaking later, he will address the results of the study, and I will only note that we are informed that the study showed no cause for health concerns based on acute ingestion of the sediment. Data from longer term chronic ingestion studies will not be available for approximately two years. The other study, performed by Battelle Columbus Laboratories, was a pathways analysis for the hypothetical scenario of a garden contaminated with sediments dredged from East Fork Poplar Creek.

The City of Oak Ridge has indicated that, since 1966, it is aware of three instances of the creek having been dredged. The City is not aware, however, of any citizens making use of the dredged creek sediments for garden use. Two of the City's dredging operations were quite small (150 cubic yards) and the material was utilized by the City for fill. The third dredging (450 cubic yards) was used as fill by contractors for the City along Emory Valley and Fairbanks Road. We have sampled these areas and the data are set forth in Exhibit 5.

Because of indications that some dredged material may have been taken without the City's knowledge and used on gardens as top soil, we commissioned Battelle to do an uptake study under varying conservative hypothetical situations, ranging from three half-ton pickup truck loads of material on a 40-foot x 40-foot garden upwards to a worst case that would require 606 half-ton pickup truck loads of material to cover a one-half acre garden three inches deep. We have no knowledge that any Oak Ridge citizen removed dredge material equivalent to even the minimum hypothetical amount, but we wanted to estimate whether there was any potential uptake at any concentration.

Battelle Columbus Laboratories analyzed the pathways for the highest and second highest levels of mercury, PCB's and radionuclides found in sediments for the complete set of scenarios and came up with the following results:

PCB's. EPA Allowable Daily Intake 210 micrograms/day

(Protective against non-carcinogenic effects, no-observable effects level)

Worst case	0.9% of standard.
Most Reasonable Case (100% of diet)	0.06% of standard.

(Risk of cancer incidence)

Worst case - About 1 in 10,000 lifetime risk.

Most Reasonable Case (100% of diet) - Less than 1 in 100,000 lifetime risk.

Radionuclides. The DOE/NRC dose limit is 500 millirem whole body.

Worst case	32.3% of standard.
Most Reasonable case (100% of diet)	2.2% of standard.

Mercury. World Health Organization Provisional Tolerable Level is 42.9 micrograms/day total Hg.

Worst case	197%
Most Reasonable Case (100% diet)	47%

These, of course, are hypothetical results based on the existing literature, which is quite limited with regard to the type and levels of mercury that exist at Oak Ridge. To obtain "real world" data and spot any potential problems, ORO has been sampling garden soils and vegetables of any individual who believes his or her garden contains East Fork Poplar Creek sediments. The first vegetable data is in and is set forth as Exhibit 6. Garden soil samples appear in Exhibit 5.

MEMORANDUM OF UNDERSTANDING

On May 26, 1983, we entered into a Memorandum of Understanding with EPA and the State of Tennessee, under which certain actions will be taken and certain areas will be studied further. A copy of the MOU is included as Exhibit 7 to my testimony. Since Mr. Zeller of EPA and Dr. Bruner of the Tennessee Department of Health and Environment will be speaking shortly, I won't discuss the MOU in my testimony in any detail. I will state that the agreement is a tough one for DOE, but fair. It will require a heavy dedication of people and money to meet the dates we have set for ourselves, but we will work diligently to assure that the Y-12 Plant -- and other ORO facilities -- are brought into compliance with applicable standards as quickly as possible.

One of the activities that I have previously mentioned will be occurring under the MOU is an Interagency Task Force study of contamination in East Fork Poplar Creek and Bear Creek. The organizational meeting of the Task Force was held June 23, and was attended by representatives of the Department of Energy, the Environmental Protection Agency, the Tennessee Department of Health and Environment, the Tennessee Valley Authority, the Tennessee Wildlife Resources Agency, the U. S. Geological Survey, the City of Oak Ridge and its Environmental Quality Advisory Board, and other interested parties. The Interagency Task Force is not limiting itself to mercury, but will also be assessing potential stream contamination by plutonium, uranium, thorium, beryllium, PCB's and lead. The Task Force has not set a time schedule for completing its studies and arriving at conclusions regarding the appropriateness of any remedial action, and it may be two to three years before its activities are concluded. Thoroughness and proper action are seen as being more important than speed, considering the lack of any immediate unaddressed health hazard, but we intend to press forward as quickly as possible consistent with a methodical and thorough evaluation of the situation.

There are two other actions mentioned in the MOU that we already had planned or underway. One is a hydrogeologic study of several waste disposal areas around the Y-12 Plant. This study, intended to provide information to assess site conditions around the disposal areas, to determine if groundwater contamination has resulted and to assess the need for and feasibility of corrective measures, will be looking for evidence of contamination by substances besides mercury, such as uranium and PCB's. The contractor, Law Engineering of Atlanta, is working on-site now, and the study results will be made available to the public, as well as the regulatory bodies, by the end of the year.

The other study, being performed by Union Carbide Corporation - Nuclear Division, is a history of waste disposal practices at the Y-12 Plant, and will include an inventory of waste deposited in various areas of the plant, to the extent possible. This will cover such substances as uranium contaminated materials, oils contaminated with PCB's, and other potentially hazardous materials. This study is expected to be completed by the end of January 1984, at which time we will release the report to the EPA, the State of Tennessee and the public.

One of the most troublesome problems at Y-12 mentioned in the MOU, in addition to the mercury contamination situation, is the S-3 Ponds. Since 1951, the four ponds, each one acre in size, have been receiving nitric acid wastes contaminated with low level enriched uranium, as well as aluminum nitrate, plating wastes, and miscellaneous lab acids and bases. Roughly half of the volume of material going into the ponds is mop water contaminated with beryllium and uranium. The ponds were constructed in the early 1950's as percolation basins, in accordance with contemporary design. They leak, and seepage from the ponds flows to Bear Creek and natural springs downgrade.

We are currently discussing with EPA and the State of Tennessee methods of handling S-3 Pond materials on an interim basis. The long term solution, however, is construction of the Central Pollution Control Facility (CPCF), which would process all of the effluents presently going into the S-3 Ponds. The funding for the CPCF has been an on-again, off-again situation, the off-again resulting primarily from a General Reduction of $51 million in FY 82 appropriations for Atomic Energy Defense Activities, which resulted in agency withdrawal of $5.4 million authorized and appropriated for the project. DOE, through its Albuquerque Operations Office, has identified methods of internally reprogramming funds to restore partial funding of the CPCF. Additional funding of $2.4 million will be necessary to assure completion of construction of the line item project that includes CPCF. After construction of the CPCF, which will take 3.5 years, the S-3 Ponds will cease to exist in their present form. We hope to award a fixed-price construction contract for CPCF by this fall. We have established that funding is available for this project in FY 83 and 84.

We are also currently involved in internal activities designed to eliminate the relatively minor continuing discharges of mercury to East Fork Poplar Creek. We determined that some two ounces of mercury per day are routinely released from New Hope Pond in six to eight million gallons of water. In October 1982, we commenced a storm sewer-drain line sampling program that revealed that our mercury releases are basically chronic, with New Hope Pond acting as a mercury "sink." We have identified drain lines from the old process buildings that are chronic sources of mercury. Many drain lines were partially clogged with debris, which formed traps for metallic mercury. Mercury puddles were found in process building fan rooms, apparently leaking out of hollow walls where vapors may have condensed. We initiated an additional cleanup program, which included cleaning the drain lines and packaging sludges for sale to a mercury sludge processor. We expect to complete the cleanup effort this summer, and then evaluate the results.

As I mentioned earlier, we are in the process of finalizing an ecological drilling program for the Y-12 Plant to provide information on mercury lost into the soil under the lithium separation process buildings, looking for mercury deposits and groundwater contamination. A draft drilling plan was furnished to EPA, the State and the City of Oak Ridge for comment and we have now factored in those comments.

Two weeks ago, a water pipe burst under one of the former lithium isotope separation process buildings, causing approximately one million gallons of water to enter New Hope Pond through the storm sewers with quantities of mercury that the water had picked up from under the process buildings. It is estimated that 1-3 pounds of mercury entered East Fork Poplar Creek as a result of the break. This has caused us to concentrate additional attention on a different area of concern: the aged piping under the process buildings. A restoration project was already underway to replace certain water pipes but we are now reviewing the need for pipe replacement in addition to those covered by the project.

The mercury that has already moved to New Hope Pond will be removed when we clean out New Hope Pond and eliminate it as an NPDES discharge permit point. Plans for dredging New Hope Pond have been developed, and are being reviewed by the State of Tennessee and EPA. We hope to complete the dredging in 1984 or 1985. We have analyzed seven cores from the pond, and found those sediments to be non-hazardous under existing waste disposal regulations. We intend to conduct the dredging activities in accordance with the TDHE guidelines so there will be no impact to East Fork Poplar Creek.

RADIOACTIVITY

The three DOE plants in Oak Ridge have consistently operated within the radiation standards established by the Nuclear Regulatory Commission and EPA. ORO's dose impacts are assessed in terms of tracing the air, water and food pathways. Those dose impacts have consistently been below the present 500 millirem dose standard that has been nationally and internationally established as providing a conservative margin of safety against adverse health impacts. The 1982 figure for total body dose to a "hypothetical maximum exposed individual" on the Oak Ridge reservation was 4.9 millirem, about one percent of the present allowable standard.

You are probably aware that EPA, on April 6, 1983, pursuant to Section 112 of the Clean Air Act, proposed a National Emission Standard for Hazardous Air Pollutants, a "NESHAP," for radionuclides. This proposed regulation would establish tighter limits for radionuclide air emissions from all DOE facilities than the standards under which we presently operate. Consistent with NESHAP's EPA has developed for chemical industry pollutants, the proposed radionuclide standard approaches control from the standpoint of installation of best available control technology, rather than the traditional health physics approach of "as low as reasonably achievable." The proposed standard is "10/30," 10 millirems to the body as a whole, 30 millirems to an organ, of the "hypothetical maximum exposed individual."

Based on EPA calculational methods, Oak Ridge National Laboratory and the Oak Ridge Gaseous Diffusion Plant should be in compliance with the proposed standard. The Y-12 Plant, however, based on EPA's calculations, would not meet the standard. This appears to be the result of the assumptions utilized by EPA in its modeling of the Y-12 Plant. The EPA model assumed that all the radionuclides from the three Oak Ridge plants were emitted from one 10-meter stack at the Y-12 Plant, rather than recognizing that the Y-12 Plant has 50 stacks of all sizes spread over a one-half square mile area and that the three plants are separated by 8 to 10 miles. ORO is presently remodeling the Y-12 situation, using EPA's dispersion and dose calculation program but with more realistic assumptions. The results of the remodeling may show Y-12's ability to meet the proposed NESHAP. If not, our estimate of the cost to retrofit new control equipment is about $20 million. Since the Clean Air Act allows a period of two years to achieve compliance with the NESHAP, if EPA's modeling proves correct and the standard is adopted as proposed, because of the combination of the Government's budget cycle and the time necessary to procure and install equipment, the Y-12 Plant would be out of compliance with the new standard for a couple of years.

On the subject of radioactivity, early ORNL burial grounds and pits leak radioactivity to surface streams in the ORNL area. In fact, the disposal pits and trenches in use until about 10 years ago were designed to allow seepage of liquids through soils where most of the radioactivity was removed -- as through a filter. All of this seepage is monitored and combined with other waste streams which pass over White Oak Dam. As noted in our annual environmental monitoring reports, radioactivity levels meet permissible standards at that point. Nevertheless, we have considered even these releases to be undesirable and have had a program under way for over five years, at about $1 million per year, to further reduce these releases. This is done by reducing the amount of rainwater which gets into the trenches and pits, through construction of diversion ditches, and better sealing over the top of the pits and burial grounds.

PCB's

Because of the nature of the Oak Ridge plants, having used huge electric motors for four decades, and because until recent years transformers serving electrical equipment used polychlorinated biphenyls, ORO has a large volume of radioactively contaminated PCB's, as well as other radioactively contaminated waste. Our intent, as indicated in a June 1982 Environmental Impact Statement entitled "Incineration Facility for Radioactively Contaminated Polychlorinated Biphenyl and Other Wastes," is to construct an EPA approved PCB incinerator that will be able to safely and almost totally destroy PCB's and other organic chemicals. This facility, expected to cost $33 million, is scheduled for completion in 1988. It will be built at the Oak Ridge Gaseous Diffusion Plant, but will serve all the facilities under Oak Ridge Operations.

ORNL ENVIRONMENTAL SITUATION

Looking at environmental concerns at Oak Ridge National Laboratory other than mercury, it is important to recall that what is now ORNL was created in 1943 with an urgent wartime mission to operate the world's first fission reactor for the production of plutonium, and to develop chemical techniques for the recovery and refinement of that plutonium. While that wartime mission and the follow-on missions of the Laboratory were conducted in a manner to afford maximum protection to workers and the environment, consistent with the standards of the day, techniques for measurement and control of radioactivity and chemicals were not as sophisticated then as they are today. As a result, there exist at ORNL many old sources of pollution that require continued attention and upgrading as improved environmental techniques become available. The focus has been on mitigating the environmental impacts of these early potential sources of pollution and in assuring that current operations are provided with state-of-the-art measurement and controls.

With regard to specific problems, early liquid low level radioactive waste operations at ORNL involved a variety of tanks, settling basins and seepage pits for the reduction of radioactivity releases. White Oak Lake, a man-made structure on the Oak Ridge reservation, was used as the final mixing and settling basin for radioactivity and it remains significantly contaminated today.

Solid radioactive wastes from ORNL and from other eastern U. S. nuclear sites (from the time when ORNL served as the southeast regional burial ground) have been disposed of in shallow trenches in six low level solid radioactive waste burial grounds at ORNL. Many of the old basins, pits and trenches have seepage to groundwater in the ORNL area. As I mentioned earlier, this seepage and leakage reaches branches of White Oak Creek, where it is monitored prior to release to the environment at White Oak Dam. As I indicated, these effluents meet applicable standards at that point. Approximately $50 million has been spent in the past 10 years in the continuing effort to improve radioactive waste operations at ORNL.

In addition to radioactivity, ORNL operations have involved a broad variety of chemicals and, of course, ordinary sanitary waste. Many of the chemicals were used on relatively urgent missions or at a time when controls and toxicities were not so clearly understood as they are today. The sewage plant at ORNL is very old and outdated, has significant rainwater inleakage and, as a result, is overloaded and the source of continual violations of the NPDES permit. We have a $1.4 million project authorized for FY 84 which will correct this problem.

Runoff from the ORNL coal storage area currently exceeds EPA standards. Many corrective measures have already been taken, and these will be completed in FY 84.

This is, admittedly, a very brief overview of the past and current environmental status of ORNL's very broad and complex research and development operation, with several potential sources of environmental releases. The main point that should be understood is that we continue to take very seriously the matter of identifying the significant sources of potential environmental concern from past and current ORNL operations, and we are continuing to institute corrective measures.

ENVIRONMENTAL SITUATION AT ORGDP

We are pleased with the present environmental situation at the Oak Ridge Gaseous Diffusion Plant, and believe that ORGDP has resolved most of its major environmental concerns. That is not to say, however, that there are not still problems being worked.

In the early days of ORGDP the K-1407B Pond was constructed to provide settling and equalization for flows from the plant uranium decontamination and recovery operation. Later, effluent from cleaning areas in the maintenance facility were also directed to this pond. These flows were neutralized and the precipitate settled in the pond. More recently, coal pile runoff from the neutralization system has been diverted to this pond.

In the 1970's, a new pond, known as 1407C, was built to receive material from the dredging of 1407B. Some classified precipitates have also been added to the 1407C pond.

The sediments in the 1407B and C Ponds present a disposal problem, and there is an FY 1986 project to fix these sediments in concrete for proper disposal. A pond will also be built to receive the coal pile runoff and segregate it from the radioactive materials in 1407B. It is presently in the engineering stage. It should be noted that monitoring wells in the area of the ponds show no evidence of leakage.

During past operations, quantities of uranium were discharged to Poplar Creek and were measured by routine sampling. Some PCB's were probably also discharged, in addition to the mercury previously discussed. It is planned that the Interagency Task Force study under the MOU will consider these contaminants.

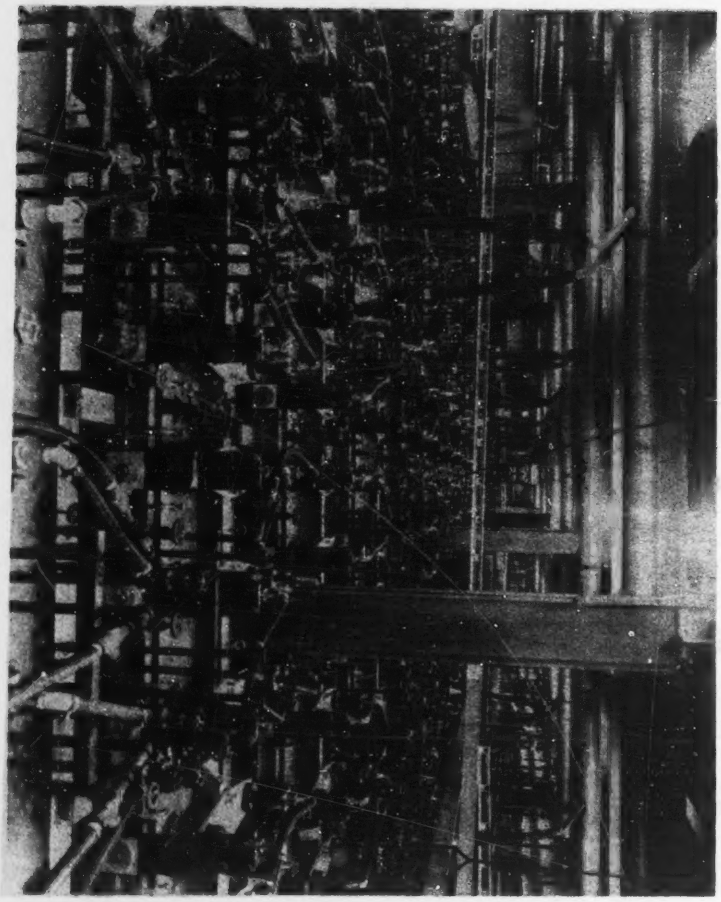
A large quantity of scrap metal, slightly contaminated with uranium, is stored in the old Powerhouse area. This material, the result of past plant upgrading and uprating operations, is stored in the flood plain of the Clinch River. Efforts are presently underway to have the scrap reduced in size so that it will be suitable for smelting.

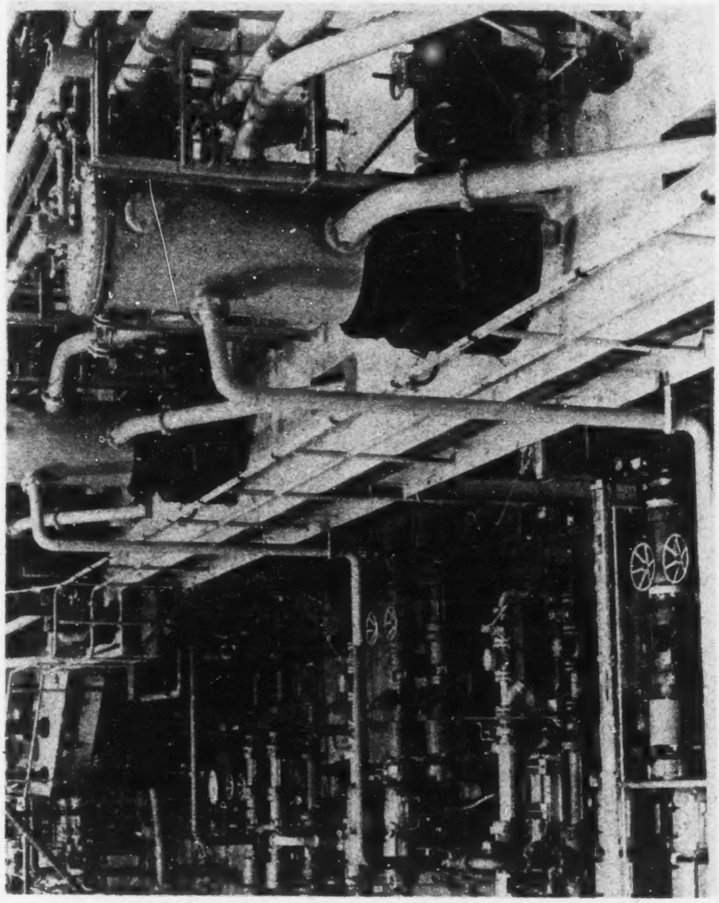
The NPDES permits for ORGDP expired in 1980, but were extended by EPA, pending renewal. Requests for renewal have been submitted, along with considerable sampling data.

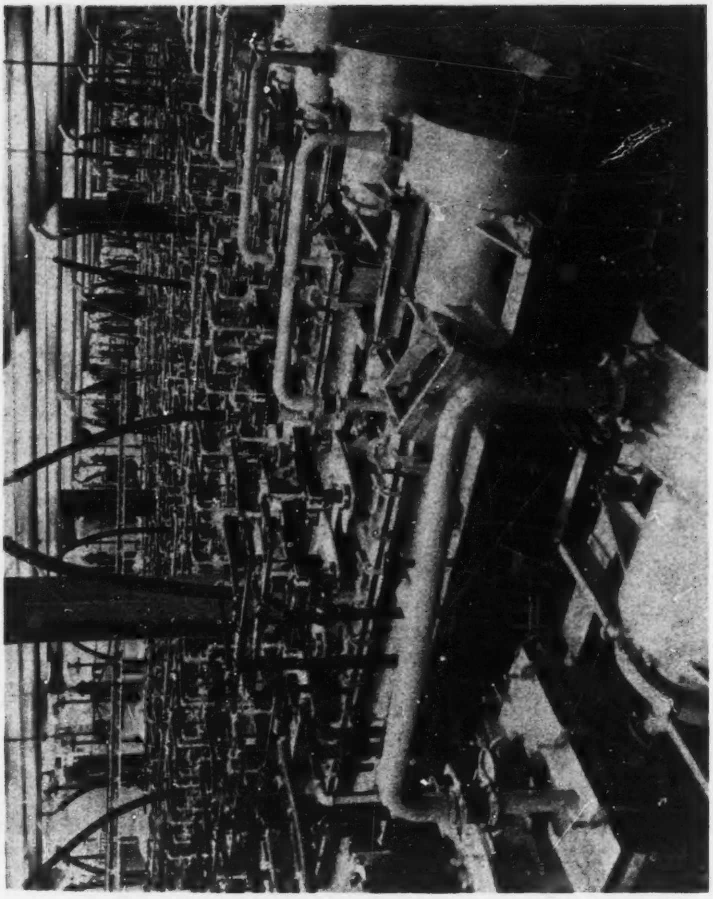
CONCLUSION

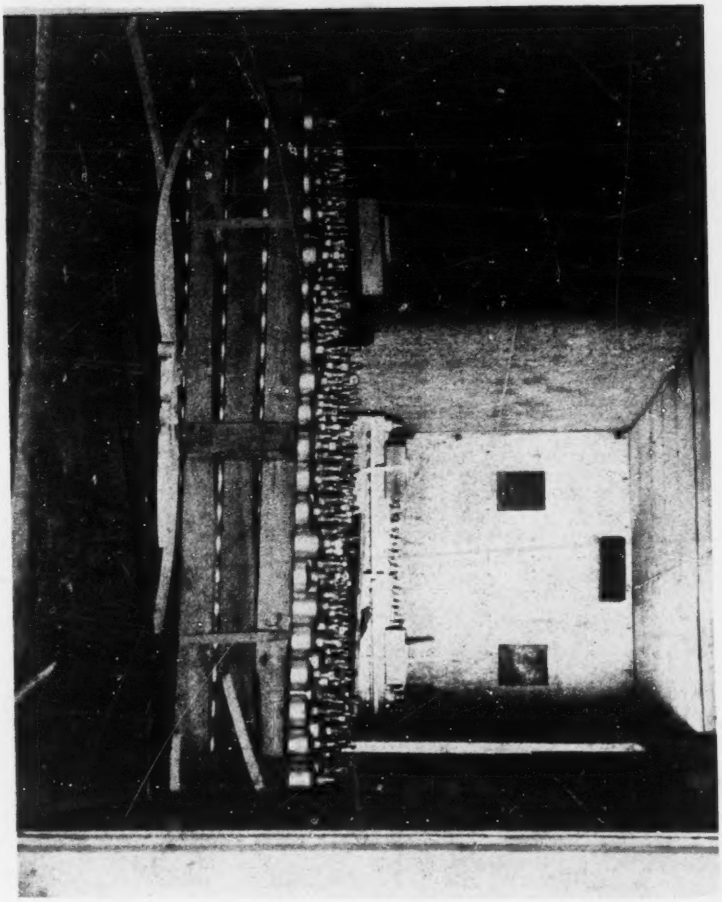
If two things come through loud and clear from my presentation today, I hope it is this: First, because of the age of its facilities and its history of being on the forefront of national security activities, ORO today has some environmental problems. Second, we are working diligently, with openness and candor, to identify and control those problems, and to bring our facilities into compliance with applicable standards. With the continued assistance of the Environmental Protection Agency, the Tennessee Department of Health and Environment, the City of Oak Ridge, the fine citizens of this area ... and the Congress ... we will be successful in our endeavors.

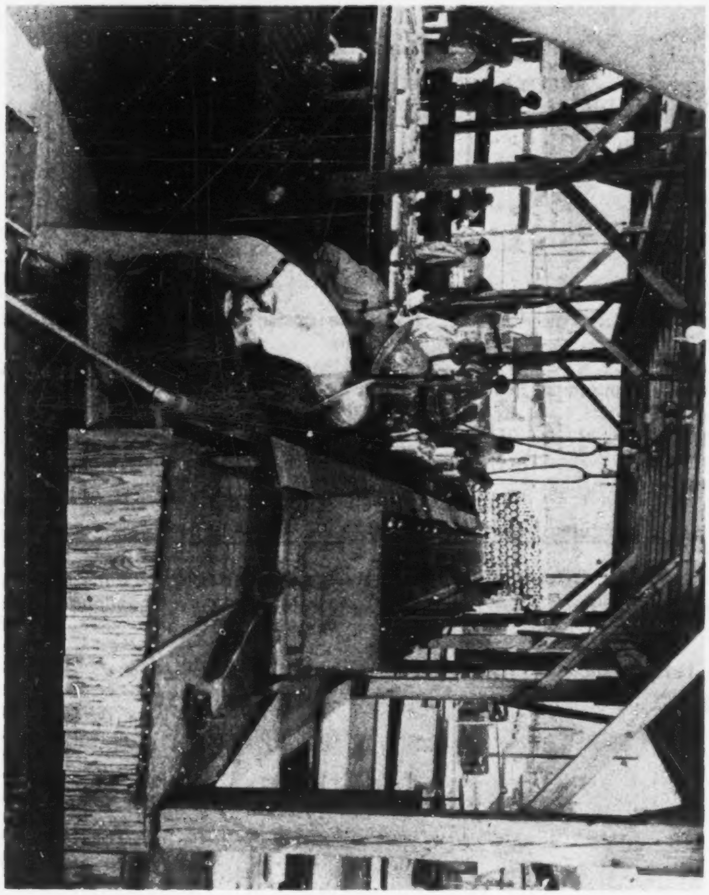
That completes my statement. I would be glad to answer any questions you may have.











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UNION CARBIDE CORPORATION
NUCLEAR DIVISION
P. O. BOX Y, OAK RIDGE, TENNESSEE 37830

June 9, 1977

United States Energy Research and Development
Administration, Oak Ridge Operations
Post Office Box E
Oak Ridge, Tennessee 37830

8724

Attention: Mr. H. D. Hickman

Gentlemen:

UNCLASSIFIED VERSION OF
Mercury Inventory at Y-12 Plant 1950 through 1977

Attached is the information you requested regarding mercury releases in the Y-12 area. Also attached is additional information to support this mercury review.

Please let us know if further information is desired.

Very truly yours,

for J. M. Case, Plant Manager
Oak Ridge Y-12 Plant

DWS:jal

Attachments: "Solvent Losses through Ventilation Exhaust Systems, Bldg. 9201-5" (C)
"Estimated Mercury Losses in Creek Waters 1955 through 1975" (OUO)

Distribution, Series A:
Copies 1-5: H. D. Hickman
6: D. J. Bostock(Y-12RC)
7: J. M. Case
8: R. F. Hibbs
9: R. G. Jordan
10: J. D. McLendon
11: C. J. Parks
12: R. D. Williams

Distribution, Series C:

H. D. Hickman, DOE-ORO

Exhibit 1

SUMMARY

The Y-12 Plant was involved with the handling of production quantities of mercury from 1950 through 1963. The maximum inventory in the Plant was during 1956-1957 Deleted 2.4 million pounds has either been lost or is material unaccounted for.

Known losses are:

1. Airborne losses

2. Creek losses

3. Recorded spills

4. Deliberate overage in bottling of Y-12 mercury for GSA

Material unaccounted for:

1. Salvage still in 9201-4

2. Anticipated overage in 9201-4 inventory

3. Mercury carried out on equipment during 9201-5 stripping operations

4. Mercury retained in the extract or "tails" material during lithium processing

5. Probable shortage of mercury in the original inventory when the system was charged by Rust Engineering Company

The majority of the mercury which was released to the environment occurred during early operations of the Colex Process, 1955 through 1958. This material was discharged either to the air, lost to the creek (approximately 230,000 pounds), or lost in the earth.

The airborne losses were reduced to practically zero in 1958. The creek losses have been less than the minimum detectable limit since 1963. There have not been any earth losses reported since operations were terminated in 1966.

Current practices and procedures for the bottling of the existing inventory minimize the possibility of any creek or earth losses. Air losses continue to be minimal. Processes are being developed to prevent the loss of any mercury when the remaining process equipment is washed and stripped from Building 9201-4.

CONCLUSIONS

1. Based on the past ten years data, it appears in the future the creek losses will not exceed the drinking standard for water.

2. In comparing loss data at the source (9201-4 and 9201-5) and the creek data leaving Y-12 with the approximate or actual data of known losses to the earth, there is no evidence that these ground losses had or have reached Poplar Creek.

3. Based on the water quality leaving Y-12 in the past 14 years by effluent sampling, it is concluded that losses to the earth are contained in the shale beneath the spill locations.

4. If the soil from the creek were excavated in a strip 20 ft. wide, 20 miles long, and to a depth of 12 inches, it would totally destroy the creek and would remove less than 4,000 pounds of mercury.

5. After inspection of all identified spill locations, it is felt that no further excavation is warranted.

RECOMMENDATIONS

1. It is recommended that monitoring for total soluble mercury in the east fork of Poplar Creek be continued.

2. Limited data on soil samples are available from the east fork of Poplar Creek. It is recommended that soil samples be taken on an annual basis to determine the rate in which the soil in the creek is being purged of mercury.

3. It is recommended that soil samples be taken in future major excavations of areas that had large quantities of mercury used and/or lost. This would determine if salvage operations are warranted.

4. A survey was made of mercury processing areas, known mercury spill locations, and the mercury storage area with the following recommendations being made:

   a. 81-10 - Visible mercury should be cleaned up and the mercury trap and settling basin cleaned.

   b. 9201-5 - One small area contaminated with mercury was found. This will be cleaned up.

   c. Increase clean-up activities in the Feed Prep./Extraction and the Evaporator areas. Drain equipment and pipe lines in the same manner that the cascade equipment is being emptied. This will leave the entire building in a "drip free" condition until final stripping is initiated.

d. Mercury storage (Building 9720-26) - No changes are recommended.

e. 9201-2 - The basement area of this building was examined in those areas where known spills and excavation had taken place. No visible mercury was seen.

INVENTORY BALANCE

Total mercury received in Y-12	Deleted
Bottled prior to 1977	
Estimate of overage when filling bottles[1]	
Estimate of material removed in 9201-5 stripping[2]	
Recovered by Mallory Battery Company	
Estimate from decommission of facility	
Mercury in extract produced[3]	
Book inventory 9201-4 December 31, 1976	
Estimated inventory error[4]	
Estimated hold up in 9201-4 salvage[5]	
Estimated hold up in 9201-4 equipment[6]	
Total estimated 9201-4 inventory	
Measured loss 9201-5 March, 1966	49,853
Creek losses through 1972[7] (soluble)	235,000
Creek losses through 1964[8] (entrained, estimated)	235,000
Mercury in sludge removed from New Hope Pond[9]	7,200
Airborne losses 1955 through 1963[10]	30,000
Total mercury accounted for	Deleted
Total mercury unaccounted for	1,880,699

[1] Y-12 bottling procedure calls for filling bottles to 76 pounds -0+2 ounces

[2] All equipment removed from 9201-5 had some mercury contamination

Deleted

[7] Creek losses 1955 to present

[8] No analysis available on entrained material. Estimated to be equal to soluble mercury

[9] Average analysis of sludge removed from New Hope Pond

[10] Letter J. C. Little to distribution dated March 4, 1956

HISTORY

I. Development and Pilot Facilities

a. Building 9733-2 - Development facility for the Elex Process (Electrical Exchange). Operated 1950 and 1951.

Mercury Inventory Deleted

Effluent control - This facility had a steel sump or trap installed in the floor drain system before entering the storm sewer. This trap was routinely checked and emptied. This system was incorporated on all of the future development and pilot facilities. Except in the event of gross spills, it proved effective in preventing metallic mercury from entering the creek.

Losses — There were no major losses reported.

b. Building 9733-1 — Development facility for the Orex (Organic Exchange) Operated 1951 and 1952.

Mercury Inventory - Deleted

Effluent control - Same as 9733-2.

Losses - There were no major losses reported.

c. Building 9201-2 - Pilot plant for the Elex Process and for the Colex (Column Exchange) Process. Operated September, 1951 through 1955.

Mercury Inventory - Deleted

This building housed several pilot plants and equipment test facilities over the four-year period and was Y-12's first involvement with significant quantities of mercury. During the operation of the different facilities there was a total loss of 108,000 pounds. Major recovery operations were conducted by excavation of dirt from the basement of this building. Visible mercury was collected from the dirt. The rest of the dirt was stored and later processed through the Nichols Hershoff furnace at Building 81-10. At one time recovery attempts were made by manually digging at the storm sewer discharge to the creek. (N. K. Bernander). There was very little mercury recovered in this attempt.

Although there was a large amount of material unaccountable as a result of operations, there is no record of any one large spill that was lost to the environment.

d. Building 9202 - Pilot plant for the Orex Process. Building operated April, 1953 through May, 1954.

Mercury Inventory - Deleted

Operations in this building were of the same magnitude as the 9201-2 facilities. Estimated losses were 50,000 pounds. There were no major spills recorded; however, when a mercury inventory showed a significant loss and it had not been recovered in the trap outside the building, the storm sewer between the building and the trap was excavated and an attempt to recover the mercury was made. The dirt from the recovery operation was stored for later processing in the Nichols Hershoff furnace. (A. D. Ryan).

2. Production Plants

a. 9204-4 Elex Production Plant operated 1953 through Spring, 1956.

Mercury inventory Deleted At the end of the program, the inventory showed a loss of 71,000 pounds. The design of this operation reduced the probability of major spills. The majority of the process equipment was on the upper levels of the building and spills could be cleaned up before getting to the outside. There were occasional spills in the salvage recovery area in the basement, some of which could have been lost to the storm drain or to the earth through cracks in the floor.

b. 9201-5 Colex Production Plant. Operated January, 1955 through February, 1959, and partial operations were resumed for a Lithium-7 production run in December, 1962 through May, 1963. The building was stripped of process equipment in 1965 and 1966.

Original design provided Deleted settling tanks to collect process overflows to prevent loss of mercury to the creek. The system was soon modified to also catch all of the building floor drains. All building effluent was pumped to a neutralizing sump south of the building where it was periodically pumped to the storm sewer. Development studies resulted in minimizing the flow to this sump and using it as a settling basin with a continuously monitored overflow.

During the initial building startup, there were numerous mercury and amalgam spills in the building. Although the volume of the spills was not recorded, recovery operations were considered to be effective but it must be assumed that mercury was lost both to the ground and to the storm sewer system.

There were three known spills of mercury on the ground outside of 9201-5 and two major spills inside the building during this period where mercury is known to have been discharged to the environment. These will be discussed in detail later.

c. 9201-4 Colex Production Plant. Operated June, 1955 through December, 1962. The design of this building was similar to that of 9201-5. Process and waste treatment improvement parallel those in 9201-5. The major auxiliary operations (Feed Prep., Extract, and Evaporation) for both buildings were conducted at 9201-4.

There were no reported major spills to the environment at this building. Process spills and leaks were similar in nature and magnitude as those in 9201-5.

d. Building 81-10 - This facility was constructed in 1956 and 1957. Operations were intermittently from March, 1957 through May, 1962. This facility was designed to recover mercury from solid wastes by evaporation and condensation. The primary feedstocks for the facility were filter solids (both lithium carbonate and powdered graphite), decomposer graphite, floor sweepings, "sludge" (solids recovered from settling tanks), and contaminated dirt (from excavating outside or ground spills). Deleted. The facility was constructed on a concrete pad with the drains being collected in a concrete mercury trap. All of the effluent from this facility flowed through the trap to a settling basin before being discharged to the creek.

Losses to the surrounding area were experienced through cracks in the concrete, water leaving the facility, and airborne losses.

3. Spills

There were five major spills during the Y-12 operations where mercury was released to the environment. These are in addition to the losses reported for 9201-2 and 9202.

a. Summer, 1955

200-400 gallons (22,500 - 45,000 pounds).

Northeast corner, 9201-5.

Condition - Plugged decomposer, Deleted

Recovery - Visible mercury shoveled off of ground (earth). Backhoes brought in to excavate. Drums of salvage dirt later processed at 81-10. (T. W. Robinson, G. W. Evans).

b. December 31, 1955

1,000 - 1,500 gallons (113,000 - 170,000 pounds).

South end of Crane Bay 6 (inside) 9201-5.

Condition - Ruptured expansion joint Deleted Mercury sprayed through south end of building.

Recovery - All visible mercury recovered inside building. Some mercury released through basement of fan room floor.

c. Summer, 1956

200-800 gallons (22,500 - 90,000 pounds).

Lost on ground at mercury dumping station.

Condition - Improper valving while transferring mercury from 9204-4 to 9201-4 and 9201-5.

Recovery - Visible mercury recovered by manually shoveling up surface dirt. Excavation by backhoes. The dirt excavated was stored in drum and later fed to Nichols Hershoff furnace at 81-10. (J. E. Smyrl).

d. Summer, 1956

200-800 gallons (22,500 - 90,000 pounds).

Lost on ground north of First Street at ramp entering 9201-5.

Condition - Improper valving while transferring mercury from 9201-5 to 9201-4.

Recovery - Visible mercury recovered by manually shoveling and vacuuming. Excavation by backhoes with dirt drummed and later fed to 81-10. (J. E. McNabb, W. H. Hubbs, D. W. Smith).

e. March, 1966

890 gallons (100,000 pounds).

9201-5 Fan Rooms E and F.

Condition - Leaky "sight glass" on storage tanks.

Recovery - Visible mercury recovered by vacuuming and sweeping

Deleted

Core drilled in basement to locate remaining mercury. No significant quantity was located.

This spill documented in United States Atomic Energy Commission report of investigating committee, "Loss of Mercury at the Y-12 Plant," dated 1966.

4. Losses

a. Airborne losses - During operations, a maximum of 30,000 pounds have been lost as airborne losses. (Letter J. C. Little to distribution dated March 4, 1956). Calculated quantity is based on Alpha-5 operations of 400 days at 20 pounds/day and 1100 days at 5 pounds/day; Alpha-4 operations of 250 days at 20 pounds/day and 2200 days at 5 pounds/day.

b. Creek losses - Creek losses of mercury totaled 470,000 pounds through 1962, with an additional 5,000 pounds being lost through 1972. Since 1972, losses have been less than 18 pounds/year. (Letter J. M. Napier to D. W. Smith dated March 5, 1977).

c. Spills - An estimate of losses to the earth is difficult to establish; however, from the inventory balance this loss could be as much as 1,880,699 pounds. The sum of unrecovered mercury from the five spills is estimated between 150,000 and 225,000 pounds.

INVENTORY SHORTAGE

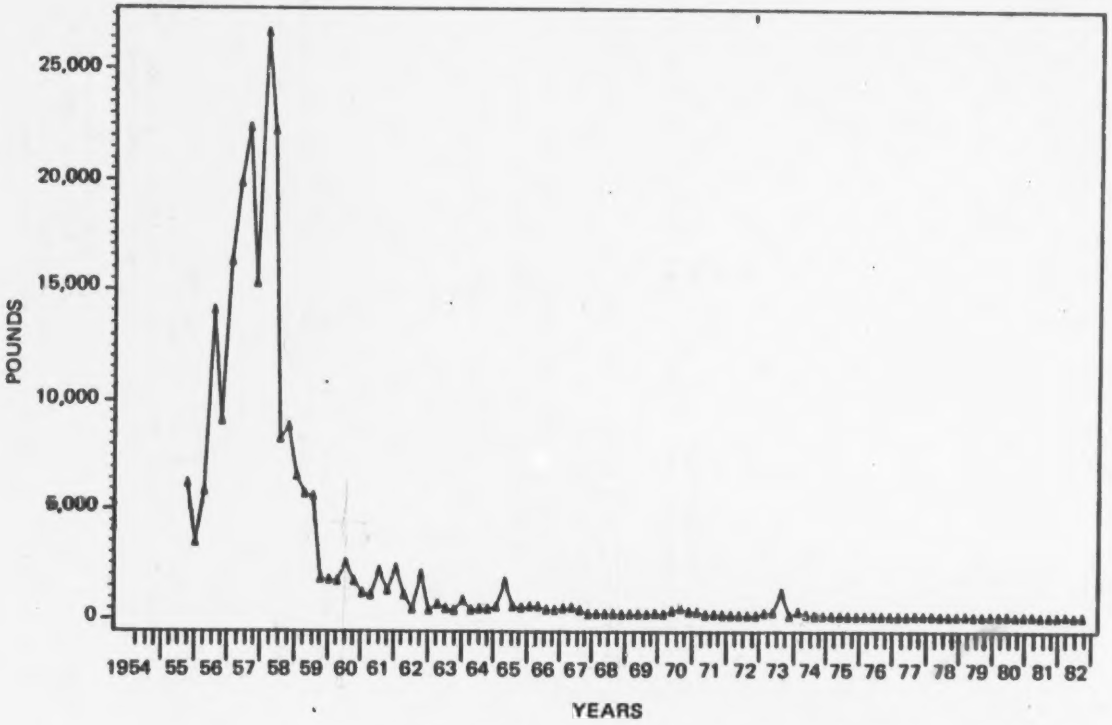
During the charging of the Colex System (9201-4 and 9201-5) in 1955, Rust Engineering Company emptied Deleted flasks of mercury. This operation was done over a period of 6 to 8 months. Although the receiving vouchers showed the quantity of flasks received to be correct, there was some comment made at that time (undocumented) that some of the flasks were only partially full or empty at the time they were emptied.

It is felt that there was an initial inventory shortage at the time the system was filled; however, no finite number is being assigned for this shortage. The following evidence is offered to support this conclusion.

1. As early as 1958 when the first mercury was being flasked and returned to GSA leaky flasks were found. These flasks were discarded.

2. During storage, it was found that some of the accepted flasks (20-25 psi pressure test) were "leakers" and these were removed from Y-12 storage upon detection.

3. These flasks were the same ones that the mercury was received in and had been in storage throughout the world for an undetermined period.



Mercury losses to East Fork Poplar Creek.

Exhibit 2

MERCURY WATER ANALYSES

WATER SAMPLE RESULTS TAKEN FROM

EAST FORK POPLAR CREEK

Exhibit 3

MERCURY WATER ANALYSES

WATER SAMPLE RESULTS TAKEN FROM EAST FORK POPLAR CREEK

(Mercury Hg/L)

1974-1982--Method of Analysis:
Flameless Atomic Absorption
Limit of Error: + 20% at 0.001 mg/L
Quality Control Program from 1979 to Present).

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1982	.003 .003 .002 .002	.002 .002 .002 .002	.04 .002 .001 .001 .002	<.001 <.001 .002 .001	.001 .001 .001 .001	<.001 <.001 .001 .001	.002 .003 .002 .001	.002 .001 .002 .001	.003 .002 .001 .002	.003 .003 .001 .002	.001 .002 .002 .002	.001 .001 <.001 <.001
1981	.003 <.001 .003 .004	.003 .003 .002 .002	.001 .002 .002 .002 .001	.002 .002 .001 .002	.004 <.001 .001 <.001	.001 <.001 <.001 .001 .001	.001 .001 .001 <.001	.002 .001 .002 <.001	.001 .002 .002 .002 .001	.001 .001 .001 .001	.001 .001 .001 .001	.001 .001 .001 .001
1980	.002 .002 .001 .002 .003 .001	.002 .003 .006 .002	.002 .003 .003 .001 <.001 .002	.002 .003 .001 .001	.002 .002 .002 .002	.002 .001 .003 .003 .002	.001 .001 .002 .004	.001 .001 .001 .002	.001 .002 .001 .001 .001	.002 .002 .002 <.001	.002 .002 .002 .002	.002 .001 .002 .002 .003
1979	.001 .002 .002 .002 .003	.001 .002 .003	.002 .001 .002 .002 .003	.001 .001 .003 <.001 .002	.002 .001 .001 <.001	.002 .001 .001 .001	.001 .002 .001 .002 .002	.002 .002 .002 <.001	<.001 .001 .002 .00118	<.001 .006 .002	.001 .002 .001 <.001	.002 <.001 .001 .001 .002 .002 .002
1978	.0033 .003 .0031 .0037 .0027 .0033 .0015	.0038 .0018 .0042 .0025 .0029 .0025 .0027 .0019	.0023 .0007 .0010 .0007	.0023 .0022 .0028 .0018	.0008 .0006 <.0005 .0019	.0008 .0010 .0009 .0011	.0008 .0008 .0005 .0005 .0017	.0015 .0012 .0015 .0008	.006 .0006 .0006 .0008	.0011	.0017 .0016 <.0005 <.0005 .0007	.0020 .0014 .0011 .001.

MERCURY WATER ANALYSES

WATER SAMPLE RESULTS TAKEN FROM EAST FORK POPLAR CREEK

(Mercury Mg/L)

1957-1973--Method of Analysis:
Hercurometer
Limit of Error: ± 40% at 0.1 mg/L

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1977	.0005	.0013	<.001	<.001	.001	.002	.0015	.003	.0015	<.001	.0049	.0028 .0026 .0028 .0034 .0037
1976	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
1975	.0011 .0020 .0015	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
1974	<.005 <.0005	<.005 <.1	<.1 <.0005	<.0005 <.1	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	
1973	--	<.0005 <.1	<.005	--	<.005 .0006	.0003 <.1	<.1	< .0004 .001 <1.0	.0002 <.1	<.0005	<.0005	<.0005 <.0005
1972	<.001 .0002 <.001 .0030 .0005	<.001 <.001	<.001 <.001	.0007 <.0002 .0003 <.0006 <.001 <.0005 <.001 <.0005 .001	.0006 <.001 <.0005 <.001 <.0005 <.001	<.0005 <.0005 <.0005	<.001 <.0005 <.001 <.001	<.0005 <.001 <.0005 <.001 <.0005 <.001	<.0005 <.0005 <.0005	<.0005 <.001 .0005 <.0005 <.001	<.0005 <.001 <.0005 <.001 <.0005 <.001	<.001
1971	<.001 <.001	.012	.039	<.015 <.001 <.001 <.001 <.001	<.01 <.001 <.001 <.001 <.001	<.01 <.0005 <.001 <.0005 <.005 <.001	<.01 .0025 <.0001 <.0001	<.01 <.001 <.001	<.01	<.01 <.001 <.001 <.001 <.001 <.001 <.001	<.01 <.0005 .0075 <.001	<.01 .0015 .0022 .0002 <.0005

MERCURY WATER ANALYSES

WATER SAMPLE RESULTS TAKEN FROM EAST FORK POPLAR CREEK

(Mercury Mg/L)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1970	<.01 <.001	.01	.01 <.0002 <.01 <.0001	.01 <.0002 <.0002	<.01 <.1 <.001	<.01 <.10 <.1 <.0010	<.01 <.1 <.001	<.01 <.10 <.001	<.01 <.1 <.1 <.001	<.01 <.10 <.1	<.01 <.001 <.001 <.0001 <.001	<.01 <.001 <.0001
1969	<.01	<.01 <.0002 <.0004 <.0002	<.01	<.01 <.0002	<.01	<.01 <.0002	<.01 <.0002	.01 <.0002	<.01	<.01 <.01	<.01	<.01 <.0002
1968	<.01 .0002 .0002	<.01 <.002 <.0002	.01	.01 <.0002	<.01 <.0002	<.01 <.0002	<.01 <.0002 <.0002	<.01 <.0002	<.01 <.0002 <.002	<.01 <.0002 <.0002	<.01 .0002	<.01 <.0002 <.0002
1967	.05 .05	.05 <.05	.01	.049	.049	<.049 <.05 <.05	<.049	.049 .0002	<.01 <.05 <.0002	<.01 <.0002 <.0002	<.01	<.01 <.0002
1966	<.05	--	--	--	--	--	--	--	--	<.05	<.01	
1965		<.05	<.05	<.05		.4115	<.05		.05	<.05	<.05	
1964	.034 .33 .010 .026 .006 .11	.011 .12 .31 .10 .032	.015 .05 .022	.013 <.05 <.050 .010 .010	.004 .013 .013 .021 .05	<.05 .008	.027		<.05	<.010	<.05	.05
1963	.016	--	--	--	--	--	--	--	.015 .022 .030 .043 .043 .015 .043 .043	.017 .033 .004 .014 .004 .004 .014 .004	.054 .014 .021 .014 .017 .033	.09 .06

MERCURY WATER ANALYSES

WATER SAMPLE RESULTS TAKEN FROM EAST FORK POPLAR CREEK

(Mercury Mg/L)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1962	--	.28 .34 .16	.26 .21 .13 .20 .06	.16 .12 .16	.10 .27 .04 .01	.06 .01 .05 .02 .01	.01 .02 .03 .003	.02 .01 <.01 <.01 <.01	.01 .04 .04 .06	.06 .03 .04 .03	.06 .20 .06 .08 .01	.06 .10 <1.0 <1.0
1961	.05 .20	.07 .16 .28 .04	.16 .10 .09 .18	.20 .15 .10	.12 .10 .09 .07	.06 .09 .07 .08	.26 .08 .05 .16	.36 .08 .17 .33	.42 .10 .18 .29 .51	.32 .11 .08	.10 .15 .13 .09	.09 .12 .05 .08 .10
1960	.18 .04 .16 .24	.09 .17 .18 .14	.05 .51 .29	.23 .24 .34 .13 .23	.16 .12 .18 .12	.21 .19 .15 .27	.15 .16 1.99 .14 .13	.23 .18 .16 .09 .14	.12 .14 .33 .85 .14	.22 .27 .15 .40	.19 .27 .61	.10 .13 .15 .07 .03
1959	.7 1.3 .7 .8 1.3	1.6 1.0 .7	.68 .9 1.5 .7	.9 .7 1.2 1.1	1.5 1.1 .5 .3 .7	.4 .3 .5 .4	1.3 1.4 .9 .6 .4	.6 1.7 .3 .2	.2 .1 1.7 .2	.24 .22 .21 .19 .24	.30 .09 .10 .30	.33 .13 .14 .19 .08
1958	1.2 3.1 2.9 3.4 10.7	3.4 3.7 3.2	2.1 3.0 5.8 1.3	4.1 1.5 3.9 1.2	2.6 14.5 2.10 2.0 2.0	.9 1.4 1.3 2.3	2.4 1.3 2.0 1.2	.9 1.0 .8 1.7 1.4	1.3 1.0 .6 .6	6.0 .49 .898 1.67 .91	.75 .6 .6 1.3	1.2 1.0 2.4 .6
1957	1.7 .51 1.7 1.17	2.6 1.9 1.7 1.20	2.3 1.7 1.3 1.74 1.4	2.54 2.2 4.03 2.0	.920 3.2 3.8 1.2 3.2	1.6 4.12 1.5 2.1 1.5	3.4 1.7 7.2 3.8	4.3 5.0 5.2 1.5 .7	1.6 2.0 1.4 1.4	.53 1.0 2.30 1.30	1.60 2.80 3.40 1.24 1.10	1.40 2.80 1.70 2.30

MERCURY WATER ANALYSES

WATER SAMPLE RESULTS TAKEN FROM EAST FORK POPLAR CREEK

(Mercury Mg/L)

Up to 1957--Method of Analysis:
Colorimetric
Limit of Error: ± 50% at 10 mg/L

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1956	.38 .43 .32 .36	<.1 .27 .18 .34	.40 .46 .10 .78 .55	.44 .32 .55 .55	.74 .70 .42 .58	1.03 1.31 .37 .89 .45	1.17 .56 .96 1.32	1.17 .67 1.19 2.31 3.60	3.6 .8 .8 1.4 3.6	.5 1.3 1.1 .48	.94 .74 .71 .79 .96 .94 .78 2.0 1.5	.74 .87 .71 1.2
1955	.15 Avg.	.59 Avg.	1.09 Avg.	1.48 Avg.	1.98 Avg.	1.93 Avg.	1.06 Avg.	1.05 Avg.	1.28 1.16 1.89 1.07 .84	.44 .33 .73 1.08 .84	.74 .71 .79 .96	.23 .40 .57 1.46 .63
1954	--	--	--	.28*	.10*	.23*	.23*	.13*	.54*	.25*	.191*	.14*

*Avg. monthly concentration in EPFC at east end of Y-12, expressed in Mg solvent/liter H_2O

During 1958-1963, water samples were obtained by a Tribullar proportional sampler for mercury in Y-12's industrial ditch. Since 1963, all other results were obtained from the effluent of New Hope Pond.

FISH DATA
for
EAST FORK POPLAR CREEK,
BEAR CREEK, POPLAR CREEK,
and
THE CLINCH RIVER

Exhibit 4

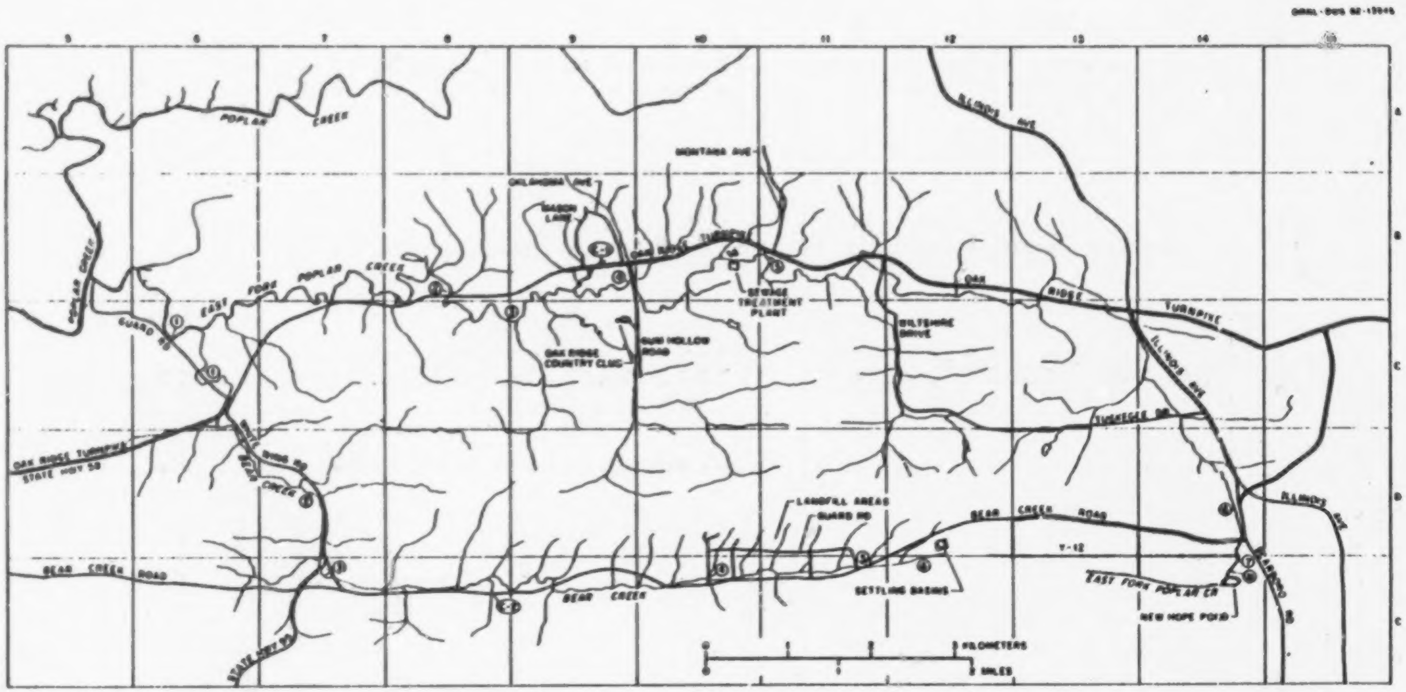
FROM: ORNL Report ORNL/CF-82/257

"Mercury Contamination in East Fork Poplar Creek

and Bear Creek"

BY: W. Van Winkle, et al.

DATE: September 7, 1982


ORNL-DWG 82-13045
5
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11
12
13
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A
B
C
D
E
POPLAR CREEK
POPLAR CREEK
EAST FORK POPLAR CREEK
GUARD RD
OAK RIDGE TURNPIKE
STATE HWY 58
WHITE WING RD
BEAR CREEK
BEAR CREEK ROAD
STATE HWY 95
OKLAHOMA AVE
GASON LAKE
MONTANA AVE
C-1
C-2
OAK RIDGE TURNPIKE
SEWAGE TREATMENT PLANT
GUM HOLLOW ROAD
OAK RIDGE COUNTRY CLUB
BILTMORE DRIVE
OAK RIDGE TURNPIKE
ILLINOIS AVE
ILLINOIS AVE
TUSKEGEE DR
ILLINOIS AVE
LANDFILL AREAS
GUARD RD
BEAR CREEK ROAD
Y-12
SETTLING BASINS
EAST FORK POPLAR CR
NEW HOPE POND
SCARBORO
0 1 2 3 KILOMETERS
0 1 2 MILES

Fig. 1. Location of sampling stations on East Fork Poplar Creek and Bear Creek. Table 1 gives types of samples collected at each station. Sites C-1 and C-2 are control stations for sediment samples.

Table A-1. Total mercury concentration in the axial muscle of fish from East Fork Poplar Creek (EFPC) and Bear Creek (BC). Locations of the sampling stations for each stream are given in Tables 1 and 2

Stream and station number	Species	Sex[a]	Weight (g)	Standard length (mm)	Total Hg concentration (µg Hg/g fresh wt)
EFPC-8	Bluegill	I	28.9	121	2.1
		I	34.1	125	1.8
		I	38.3	136	2.0
		F	55.7	146	1.7
		F	62.1	156	3.6
		M	85.3	168	1.8
		M	135.4	179	1.9
EFPC-7	Bluegill	I	19.8	105	0.69
		I	29.1	118	1.7
		I	31.2	120	1.7
		F	33.8	125	1.8
		F	36.3	126	0.66
		F	43.9	133	1.3
		F	63.9	158	1.2
		M	76.4	162	2.7
		M	85.3	159	1.5
		M	121.8	184	2.3
		M	130.1	182	2.3/2.7[b]
	Green sunfish	M	75.3	149	1.8
EFPC-5	Bluegill	I	8.5	72	1.2
		F	21.5	112	0.84
		I	24.6	112	0.73
		F	39.2	118	1.7
		M	41.7	125	1.4
		F	43.3	127	2.0
		F	61.2	137	1.1
		F	67.2	143	1.3
		F	87.4	152	1.7
		M	91.2	155	1.3/0.97[b]
		F	114.7	165	2.2
EFPC-1	Bluegill	ND	14.7	91	0.32
		ND	17.0	100	0.56
		ND	21.2	113	0.66
		ND	21.5	97	0.50
		ND	23.4	105	0.46
		ND	25.9	110	0.70
		F	37.5	121	0.45/0.52[b]
		ND	38.2	123	0.59
		ND	41.5	122	0.60
		ND	46.0	130	0.52
		M	70.7	140	0.72
	Largemouth bass	F	19.0	123	1.3
	White bass	I	24.4	146	0.15
		F	729.7	388	0.38/0.34[b]
	Rock bass	F	57.6	135	0.63
		M	82.1	154	0.87

Table A-1. (continued)

Stream and station number	Species	Sex[a]	Weight (g)	Standard length (mm)	Total Hg concentration (μg Hg/g fresh wt)
BC-1	Bluegill	M	30.3	121	0.33
		M	31.1	116	0.38
		M	35.7	121	0.51
	Rock bass	ND	29.5	116	0.25
		F	30.7	121	0.23
		F	39.5	125	0.33
		F	39.7	135	0.31
		F	53.5	141	0.27
		M	67.6	157	0.25
		M	80.1	160	0.26
		M	87.0	164	0.27/0.31[b]
		M	100.5	173	0.29
		F	108.9	180	0.62
		F	118.5	185	0.76/0.86[b]
		F	180.4	200	1.1/1.2
		M	177.8	205	0.83/0.74[b]
	Largemouth bass	F	154.2	218	0.62
		F	163.4	224	0.69

[a] I = immature, F = female, M = male, ND = not determined.

[b] Analyses of replicate muscle samples.

POPLAR CREEK

FISH SAMPLING DATA

SPECIAL SAMPLING PROGRAM

1982 ONLY

SAMPLING SITES AND METHODS

The three sampling sites are indicated in the attached figure as PC-1, PC-2, and PC-3. These are the same three sampling sites in Poplar Creek used during the ORGDP survey in 1977-1978 (Loar, 1981). The trotlines used to collect catfish at station PC-2 on June 3, 1982, were actually set several 100 meters downstream from the triangle in the attached figure at the bend in the river but upriver from the Blair Road bridge. With the exception of using trotlines on June 3 to increase the sample size of catfish, fish were collected and processed as described in Loar (1981, pp. 32-33).

Loar, J. M. (ed.) 1981. Ecological studies of the biotic communities in the vicinity of the Oak Ridge Gaseous Diffusion Plant. ORNL/TM-6714.

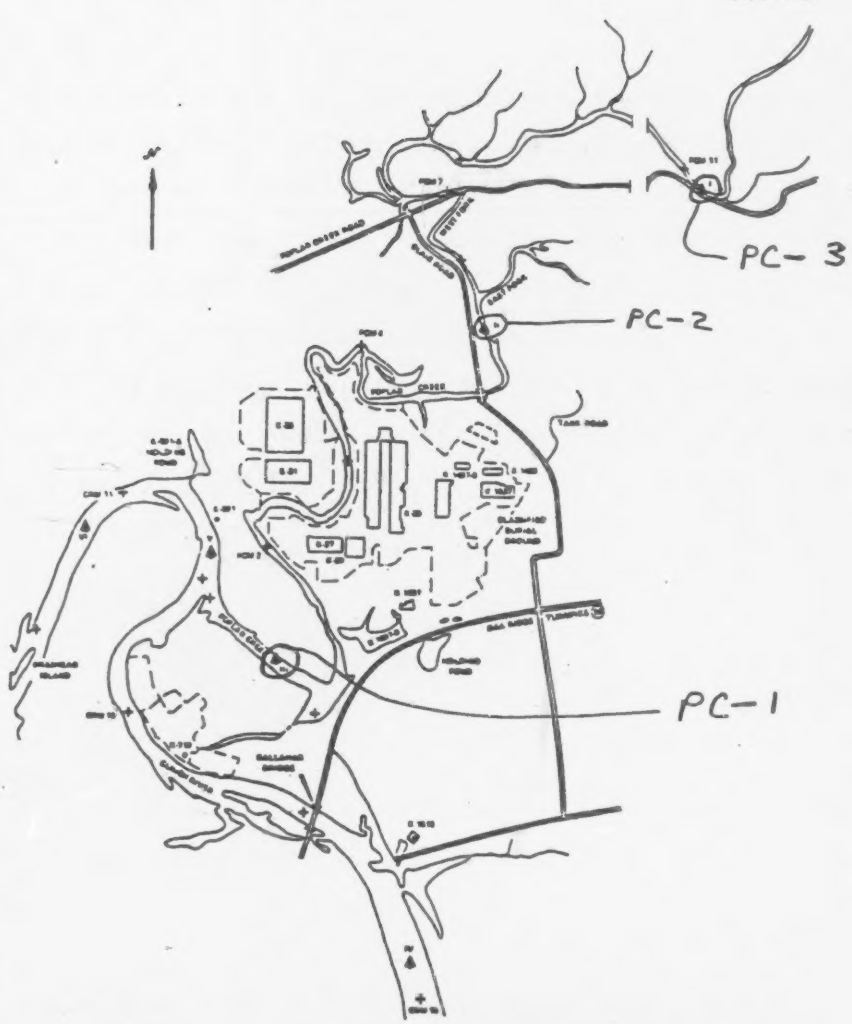


Fig. 1.2-1. Location of the six sites (▲) on Poplar Creek and the Clinch River where biological sampling was conducted during the ORGDP survey, April 1977-September 1978.

FROM: Loar, J. M. (ed.) 1981. Ecological studies of the biotic communities in the vicinity of the Oak Ridge Gaseous Diffusion Plant. ORNL/TM-6714.

Table 1. Results from Fish Analysis Program

Location (Poplar Creek)	Sample Code	Species	Length (cm)	Weight (gram)	Sex	PCBs as 1260 μg/g Fish	Uranium μg/g Fish	CH_3Hg^+ as Hg μg/g Fish
PC-1	1	Yellow Bass	16.8	54.5	F	0.1	0.007	0.25
"	2	" "	17.6	65.5	F	<0.1	0.007	0.20
"	3	" "	17.5	63.1	M	0.2	<0.003	0.18
"	4	" "	17.7	65.4	F	<0.1	<0.003	0.09
"	5	" "	16.5	58.6	M	0.1	0.004	0.18
"	6	" "	17.1	62.4	M	0.2	0.010	0.11
"	7	" "	14.0	32.8	M	<0.1	0.012	0.10
"	8	" "	14.1	32.8	F	<0.1	0.011	0.08
"	9	" "	13.0	28.4	M	0.1	0.010	0.06
"	10	" "	13.5	28.5	M	<0.1	0.018	0.09
"	11	Drum	22.6	132.7	M	<0.1	0.007	0.08
"	12	"	16.0	38.7	M	<0.1	0.015	0.07
"	13	Bluegill	15.7	84.7	F	<0.1	0.009	0.07
"	14	"	13.7	54.3	M	<0.1	0.007	0.15
"	15	"	14.7	72.7	M	<0.1	0.007	0.23
"	16	"	12.2	36.0	M	<0.1	0.004	0.32
"	17	"	11.3	31.6	F	<0.1	0.009	0.24
"	18	Striped Bass	14.1	23.0	?	0.2	0.008	0.08
"	19	" "	24.0	153.9	M	<0.1	<0.003	<0.05
"	20	White Bass	29.3	315.4	M	<0.1	0.004	<0.05
"	21	Hybrid	38.7	817.1	M	<0.1	0.005	0.28
"	22	Spotted Bass	13.7	35.7	F	<0.1	<0.003	0.11
"	23	Channel Catfish	51.6	1255.6	?	0.4	<0.003	1.34
PC-2	24	Crappie	17.7	50.3	?	0.4	0.009	0.48
"	25	"	20.0	70.2	M	0.3	0.005	0.55
"	26	"	21.8	98.1	M	0.1	<0.003	0.39
"	27	"	21.6	93.8	F	0.1	<0.003	0.46
"	28	"	20.3	85.9	F	0.2	0.004	0.31
"	29	"	20.3	84.3	F	0.2	<0.003	0.34
"	30	"	22.3	108.2	F	0.4	0.004	0.46
"	31	"	19.5	66.1	F	0.2	0.005	0.35
"	32	"	20.5	81.1	F	0.2	0.006	0.40
"	33	"	34.2	546.6	F	0.2	<0.003	0.63
"	34	Yellow Bass	17.2	56.6	F	0.1	0.010	0.52
"	35	" "	18.9	65.9	F	0.2	0.007	0.42
"	36	" "	16.1	46.1	M	0.3	0.013	0.50
"	37	" "	14.6	33.7	F	0.1	0.019	0.09
"	38	" "	16.0	59.9	F	0.1	0.011	0.35
"	39	" "	14.5	31.8	M	0.3	0.013	0.12
"	40	" "	13.4	25.2	M	0.2	0.017	0.07
"	41	" "	13.7	27.3	M	<0.1	0.009	0.14
"	42	" "	11.8	17.9	M	<0.1	0.012	0.43

Table 1. Results from Fish Analysis Program (continued)

Location (Poplar Creek)	Sample Code	Species	Length (cm)	Weight (gram)	Sex	PCBs as 1250 μg/g Fish	Uranium μg/g Fish	CH_3Hg^+ as Hg μg/g Fish
PC-2	43	Drum	24.5	165.8	F	<0.1	0.007	0.52
"	44	Sm. Mouth Bass	14.5	29.0	M	<0.1	0.007	0.58
"	45	Lg. Mouth Bass	13.5	25.0	M	<0.1	0.006	0.64
"	46	" " "	22.9	145.8	F	<0.1	<0.003	1.03
"	47	Bluegill	15.4	58.9	M	<0.1	<0.003	0.69
"	48	"	15.6	81.9	F	<0.1	0.004	0.40
"	49	"	14.6	48.9	F	<0.1	0.017	0.50
"	50	"	13.6	39.9	F	<0.1	0.004	0.40
"	51	"	13.1	45.0	M	<0.1	0.006	0.36
"	52	"	12.1	37.8	F	<0.1	<0.003	0.44
"	53	"	12.1	36.8	M	<0.1	0.009	0.42
"	54	"	10.6	19.4	M	<0.1	<0.003	0.45
"	55	"	10.3	18.7	M	0.1	0.009	0.39
"	56	"	9.3	13.2	M	<0.1	INS	0.33
"	91	Blue Catfish	39.6	492.0	F	<0.1	0.008	0.06
"	92	" "	35.4	341.0	M	<0.1	0.009	0.07
"	93	Channel Catfish	44.1	887.0	F	0.5	0.007	1.07
"	94	" "	55.2	225.5	F	0.7	0.004	0.29
"	95	" "	56.1	1750.0	M	0.5	0.005	0.40
"	96	" "	52.7	1539.0	M	0.3	0.008	0.70
PC-3	57	Crappie	21.7	110.5	F	<0.1	<0.003	0.11
"	58	"	23.0	123.1	F	0.2	<0.003	0.48
"	59	"	22.4	104.1	M	<0.1	<0.003	0.17
"	60	"	24.0	138.3	F	<0.1	<0.003	0.37
"	61	"	21.1	93.1	M	<0.1	0.005	0.15
"	62	"	21.8	105.8	M	<0.1	<0.003	0.42
"	63	"	21.6	91.3	M	<0.1	<0.003	0.23
"	64	Bluegill	19.4	158.4	M	<0.1	0.004	0.35
"	65	"	18.5	135.5	M	<0.1	<0.003	0.47
"	66	"	16.7	106.6	M	<0.1	0.004	0.30
"	67	"	18.9	142.3	M	<0.1	0.004	0.52
"	68	"	17.7	110.3	F	<0.1	0.001	0.78
"	69	"	15.8	74.7	F	<0.1	0.004	0.40
"	70	"	14.0	60.5	M	<0.1	0.004	0.28
"	71	"	13.9	54.8	F	<0.1	0.005	0.24
"	72	"	12.2	31.2	F	<0.1	0.015	0.38
"	73	"	11.7	27.8	F	<0.1	0.006	0.21
"	74	Drum	26.2	163.9	M	0.1	<0.003	0.15
"	75	"	21.9	108.6	M	<0.1	<0.003	0.08
"	76	"	20.3	74.2	M	<0.1	0.004	0.30
"	77	Lg. Mouth Bass	25.1	204.8	M	<0.1	0.003	0.43
"	78	" " "	19.0	76.4	M	<0.1	<0.003	0.59
"	79	" " "	14.9	33.2	M	1.0	0.006	0.38

Table 1. Results from Fish Analysis Program (continued)

Location (Poplar Creek)	Sample Code	Species	Length (cm)	Weight (gram)	Sex	PCBs as 1260 μg/g Fish	Uranium μg/g Fish	CH_3Hg^+ as Hg μg/g Fish
PC-3	80	Sauger	37.5	371.1	M	<0.1	0.003	0.26
"	81	"	44.6	734.6	M	0.2	0.004	0.44
"	82	"	46.9	951.6	F	0.1	0.003	0.70
"	83	"	39.1	484.0	M	0.2	0.025	0.63
"	84	"	38.3	524.1	M	0.2	0.009	0.24
"	85	Blue Catfish	52.7	1313.1	M	0.5	0.007	0.18
"	86	Channel Catfish	31.5	238.2	M	0.1	0.005	0.12
"	87	" "	35.0	352.2	M	0.4	0.013	0.11
"	88	Yellow Catfish	34.8	300.5	M	0.3	0.005	0.06
"	89	" "	47.5	1083.0	M	0.4	0.011	0.15
"	90	" "	37.5	435.2	M	<0.1	0.005	0.11

INS = Insufficient sample

Table 2. Comparison of Reference Values and ORGDP Values for PCBs in Fish Concentrate No. 1^A

U.S. EPA Reference Value μg/g		ORGDP value μg/g
PCB 1260	0.92 ± 0.36	1.4 ± 0.3*
PCB 1254	3.12 ± 1.32	
PCB 1242	1.12 ± 0.83	

* Average of 12 determinations
A At 95% confidence limit

REFERENCES

1. Environmental and Effluent Analysis Control Manual, Union Carbide Corporation, Nuclear Division.

2. ASTM, Part 31, Methods for Water, D3534-76-T, 1978.

3. Fed. Regis., 44, 38330 (June 29, 1979).

4. Anal. Chem., 1981, 53, 2305.

5. Environmental Research 1971, 4, 1-69

6. Chemical Fallout; M. W. Miller, G. G. Berg, Eds., Charles C. Thomas, Springfield, IL, 1969, p. 75.

FROM: UCC-ND Report Y/UB-18

"Environmental Monitoring Report - United States

Department of Energy - Oak Ridge Facilities -

Calendar Year 1982"

BY: Union Carbide Corporation - Nuclear Division

DATE OF ISSUE: May 1, 1983

Table 28
MERCURY CONTENT IN CLINCH RIVER FISH
1982

LOCATION	Species[a]	CONCENTRATION ng/g - Wet Weight	% A.L.[b]	PPM*
CRM 5.0	Bass	120	12	.12
	Blue Gill	170	17	.17
7 miles below Poplar Creek	Carp	280	28	.28
	Shad	30	3	.03
	Crappie	59	6	.06
CRM 10.0	Bass	200	20	.20
	Blue Gill	150	15	.15
2 miles below Poplar Creek	Carp	210	21	.21
	Shad	29	3	.03
	Crappie	99	10	.10
CRM 12.0	Bass	220	22	.22
	Blue Gill	560	56	.56
Poplar Creek	Carp	530	53	.53
	Shad	190	19	.19
	Crappie	180	18	.18
CRM 20.8[c]	Bass	99	10	.10
White Oak Creek	Blue Gill	160	16	.16
	Carp	240	24	.24
	Shad	19	2	.02
	Crappie[d]	43	4	.04
CRM 25.0	Bass	13	1	.01
	Blue Gill	34	3	.03
2 miles above Melton Hill Dam	Carp	97	10	.10
	Shad	7	1	.01

[a] Composite of ten fish in each species.

[b] Percent of proposed FDA mercury in fish action level of 1000 ng/g.

[c] Average of quarterly samples.

[d] Average of three quarterly samples. Crappie were not collected in the second quarter.

*Parts per Million - added for clarification - 7/1/83

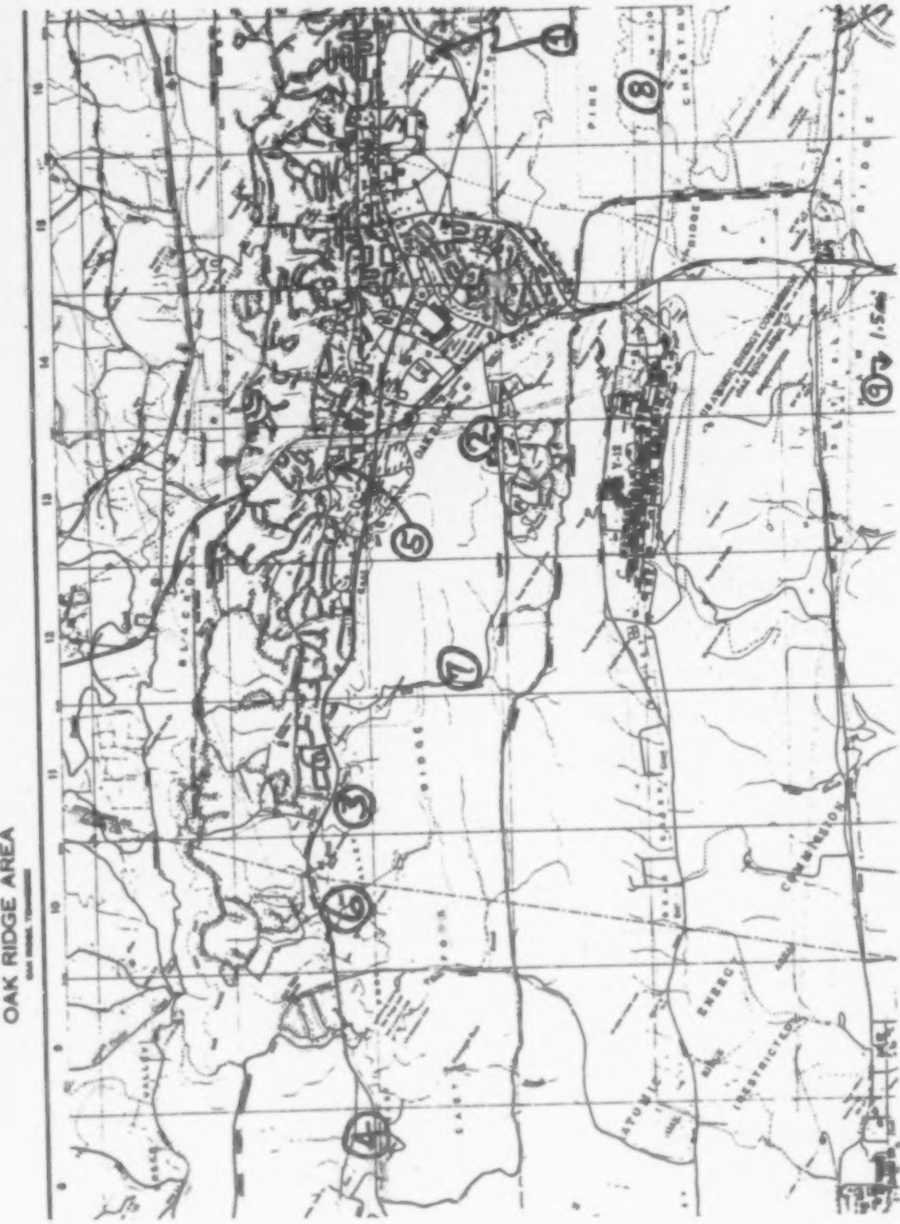
SEDIMENT, WATER, AIR & SOIL DATA

MERCURY SAMPLING AND DATA

The sampling locations listed below are identified on the attached map.

1. Fairbanks Road
2. Scarboro Community
3. Greenview Estates
4. Robertsville Junior High School
5. East Fork Poplar Creek
6. West Tuskeegee Drive
7. Background, Union Road
8. Background, Freels Bend

Exhibit 5


OAK RIDGE AREA
Y-12
ATOMIC
ENERG
COMMISSION
(RESTRICTED)
PINE
RIDGE
1
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9

1. FAIRBANKS ROAD

* SOIL (parts per million)

Jefferson Junior High School Area and Fairbanks Road

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
3 Meters from Entrance	5/25/83	83-0001	2.4 ppm
30 Meters from Entrance	5/25/83	83-0002	5.0
60 Meters from Entrance	5/25/83	83-0003	0.05
90 Meters from Entrance	5/25/83	83-0004	2.4
120 Meters from Entrance	5/25/83	83-0005	18
170 Meters from Entrance	5/25/83	83-0006	40
50' North of JJHS Exit on Sewer Line Belt	6/13/83	83-0050	250
40' North of Exit	6/13/83	83-0051	155
30' North of Exit	6/13/83	83-0052	75.0
20' North of Exit	6/13/83	83-0053	250
10' North of Exit	6/13/83	83-0054	230
10' South of Exit	6/13/83	83-0055	120
20' South of Exit	6/13/83	83-0056	155
30' South of Exit	6/13/83	83-0057	140
40' South of Exit	6/13/83	83-0058	150
50' South of Exit	6/13/83	83-0059	200
50' SW of Telephone Pole (Control)	6/13/83	83-0060	4.1
.3 mile from Exit Toward Nautilus Club	6/13/83	83-0061	155

2. SCARBORO COMMUNITY

* WATER (parts per billion)

Scarboro Community

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
250' Upstream Spellman Avenue	6/14/83	83-0067	<0.05 ppb
200' West of Dillard Avenue	6/14/83	83-0071	<0.05
300' West of Tuskeegee Drive	6/14/83	83-0075	0.05
30' North of Tusculum Drive	6/14/83	83-0079	<0.05

* SOIL (parts per million)

Scarboro Community

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
6' from Creek (83-0067)	6/14/83	83-0069	0.40 ppm
20' from Creek (83-0067)	6/14/83	83-0070	0.10
6' from Creek (83-0071)	6/14/83	83-0073	0.15
30' from Creek (83-0071)	6/14/83	83-0074	0.80
10' from Creek (83-0075)	6/14/83	83-0077	<0.05
100' from Creek (83-0075)	6/14/83	83-0078	<0.05
10' from Creek (83-0079)	6/14/83	83-0081	0.05
Floodplain 30' North of Tusculum Drive & 150' West of Creek	6/14/83	83-0082	0.85

* SEDIMENT (parts per million)

Scarboro Community

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
250' Upstream Spellman Avenue	6/14/83	83-0068	<0.05 ppm
200' West of Dillard Road	6/14/83	83-0072	<0.05
300' West of Tuskeegee Road	6/14/83	83-0076	<0.05
30' North of Tusculum Drive	6/14/83	83-0080	0.05

2. SCARBORO COMMUNITY

* TURTLES

Scarboro Community

LOCATION	RESULTS [µgHg/g(Avg)]
Tuskeegee Creek	0.12
Tuskeegee Creek	0.058
South Hills Pond	0.056
East Fork Poplar Creek (Winn-Dixie)	0.46

3. GREENVIEW ESTATES

* WATER (parts per billion)

Greenview Estates - East Fork Poplar Creek

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
#8 on Map	6/8/83	83-0034	0.25 ppb
#14	6/8/83	83-0040	0.25

* SOIL (parts per million)

Greenview Estates - Small Garden

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
South Edge of House	6/8/83	83-0031	8.0 ppm

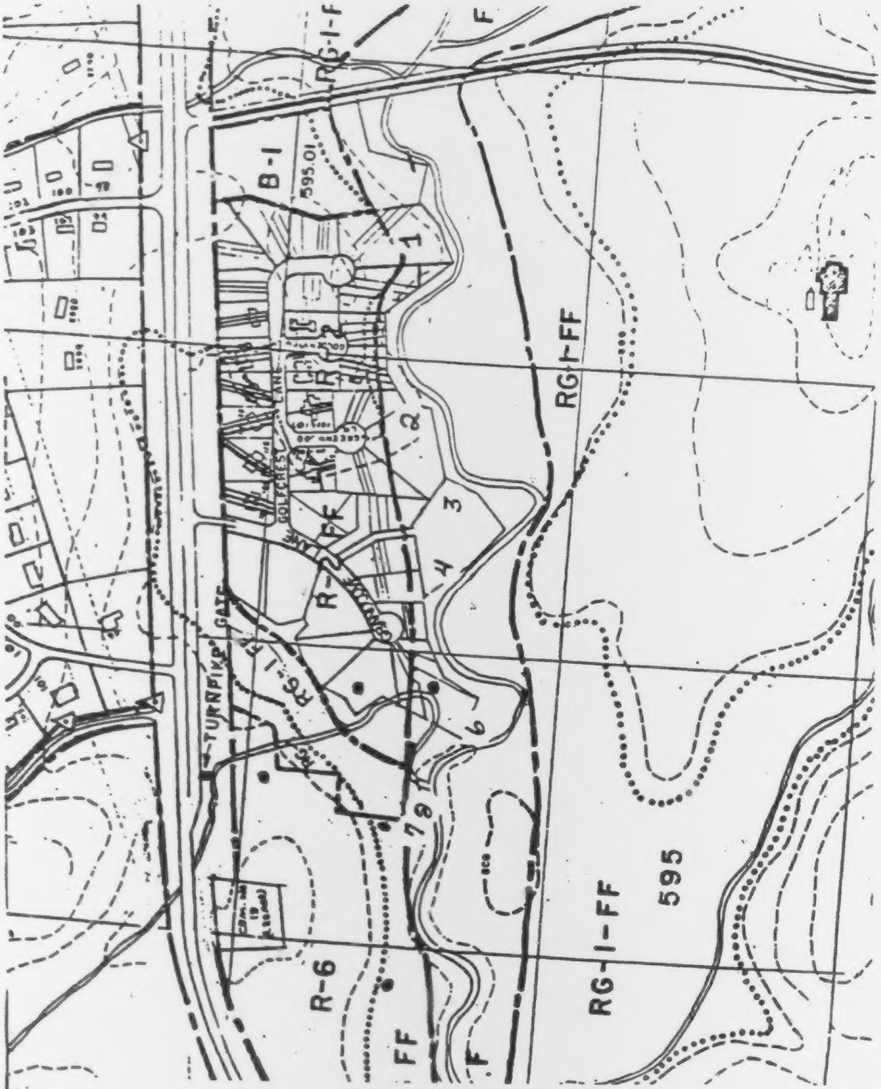
Greenview Estates - Along Creek (See Map) (Undisturbed Soil)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
#1 on Map	6/8/83	83-0027	1.5 ppm
#2	6/8/83	83-0028	5.2
#3	6/8/83	83-0029	1.1
#4	6/8/83	83-0030	25
#6	6/8/83	83-0032	14
#7	6/8/83	83-0033	13
#9	6/8/83	83-0035	18
#10	6/8/83	83-0036	9.0
#11	6/8/83	83-0037	1.8
#12	6/8/83	83-0038	35

* SEDIMENT (parts per million)

Greenview Estates - East Fork Poplar Creek

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
100' Upstream of Turnpike Bridge	6/8/83	83-0039	39 ppm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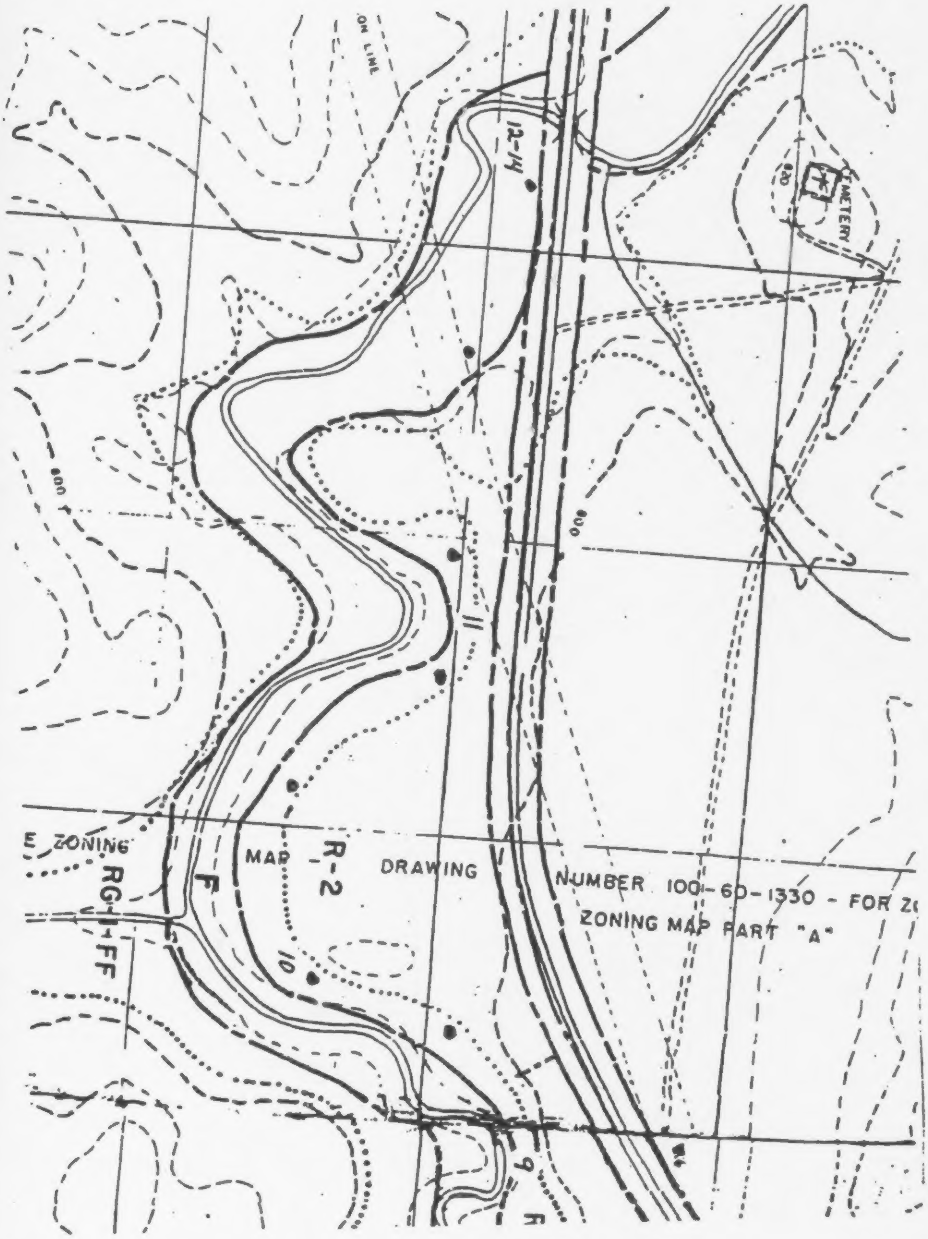
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F
10
9
R

4. ROBERTSVILLE JUNIOR HIGH SCHOOL

* WATER (parts per billion)

Robertsville Junior High School including Tennis Courts and Robertsville Area

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Creek behind Robertsville Jr. High	5/25/83	83-0008	0.75 ppb
Creek behind Green's Honda	5/27/83	83-0017	0.40
Creek at Robertsville Jr. High	5/27/83	83-0013	0.35
Creek at Robertsville Jr. High	5/27/83	83-0011	0.20
Creek at Robertsville	5/27/83	83-0015	0.35

Oak Ridge City - Outside Swimming Pool

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Spring House	6/3/83	83-0024	<0.1 ppb
North Side Pool	6/3/83	83-0023	<0.1
South Side Pool	6/3/83	83-0022	<0.1

* SOIL (parts per million)

Robertsville Junior High School Area

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Edge of Creek	5/25/83	83-0010	10 ppm
5 yards from Creek-Near West Ballfield	5/27/83	83-0012	9.0
5 yards from Creek-Between West & East Ballfields	5/27/83	83-0014	15
5 yards from Creek-Centerfield East	5/27/83	83-0016	13
Baseball Diamond - Home Plate	6/20/83	83-0094	0.05
Pitcher's Mound	6/20/83	83-0095	0.1
Edge of Infield Behind Second Plate	6/20/83	83-0096	0.3

4. ROBERTSVILLE JUNIOR HIGH SCHOOL PAGE 2

Jefferson Avenue (50' Upstream from SW Corner of Bridge)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
30' West, Approximately 6' Upstream Bank	6/13/83	83-0063	37 ppm
30' West of 83-0063	6/13/83	83-0064	35
85' 180° from SW Corner of Bridge	6/13/83	83-0065	18
200' 107° from SW Corner of Bridge	6/13/83	83-0066	16.5

Jefferson Avenue Behind Green's Honda

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
5 yards from Creek	5/27/83	83-0018	15 ppm

Garden Area Behind YWCA

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Soil on Asphalt Pad	6/8/83	83-0026	0.30 ppm
Southeast Corner	6/9/83	83-0041	0.25
20' from East Edge of Garden	6/9/83	83-0042	0.30
20' from East Edge of Garden	6/9/83	83-0043	0.20
Center of Garden	6/9/83	83-0044	0.20
Southwest Corner of Garden	6/9/83	83-0045	0.20
Northwest Corner of Garden	6/9/83	83-0046	0.17

* SEDIMENT (parts per million)

Bank Samples

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
3' from Creek, Near NE Corner	6/9/83	83-0048	42 ppm
3' from Creek, 30' Upstream	6/9/83	83-0049	52
50' Upstream from SW Corner of Bridge	6/13/83	83-0062	27

5. EAST FORK POPLAR CREEK

* WATER (parts per billion)

East Fork Poplar Creek

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Creek at Gum Hollow Road	5/25/83	83-0009	1.4 ppb
Creek at Big Turtle Park	5/25/83	83-0019	0.45

* SOIL (parts per million)

Big Turtle Ballfield Area

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
5 yards from Creek	5/27/83	83-0020A	0.06 ppm
Home Plate	6/20/83	83-0091	0.05
Pitcher's Mound	6/20/83	83-0092	0.10
Edge of Infield Behind Second Plate	6/20/83	83-0093	0.05

* SEDIMENT (parts per million)

Gum Hollow Road

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Creek Sediment	5/25/83	83-0007	6.3 ppm

6. WEST TUSKEEGEE DRIVE

* WELL WATER (parts per billion)

Water from Two Wells

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
1001 Tuskeegee Drive	5/27/83	83-0020	<0.1 ppb
1101 Tuskeegee Drive	5/27/83	83-0021	<0.1

7. BACKGROUND, UNION ROAD

* SOIL (parts per million)

Union Road

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
.1 mile on Union East of Illinois	6/14/83	83-0083	.05 ppm
Same as 83-0083 - 300' South of Road	6/14/83	83-0084	.10
Same as 83-0083 - 600' South of Road	6/14/83	83-0085	.10
.3 miles East of Hwy 62 North of Union Road	6/15/83	83-0089	<.05
Same as 83-0089 - Further Off Road	6/15/83	83-0090	.10

8. BACKGROUND, FREELS BEND

* SOIL (parts per million)

Freels Bend

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Opposite Side of Cabin at Inlet 80' South of Telephone Pole	6/15/83	83-0086	0.2 ppm
50' South of Pole	6/15/83	83-0087	0.1
100' South of Pole	6/15/83	83-0088	0.05

VEGETABLE DATA

MERCURY IN VEGETABLES

Vegetable	Mercury Content (PPM)	Soil Analysis (PPM)
Tomato (1 sample)*	<0.002	0.90*
Carrot (from California)**	0.004	

*From garden on Gum Hollow Road.

**Control Sample from Local Supermarket

Exhibit 6

MEMORANDUM OF UNDERSTANDING
BETWEEN THE
U.S. DEPARTMENT OF ENERGY
AND THE
U.S. ENVIRONMENTAL PROTECTION AGENCY AND
STATE OF TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT
CONCERNING COMPLIANCE WITH POLLUTION CONTROL
STANDARDS AT THE DEPARTMENT OF ENERGY Y-12
PLANT, ANDERSON AND ROANE COUNTIES, TENNESSEE

This Memorandum of Understanding (MOU) is intended to clarify the compliance objectives agreed upon by the parties during a meeting held in Atlanta on April 8, 1983. Analysis of information received from the Department of Energy (DOE) along with information gathered as a result of a February 23, 1983, Compliance Evaluation Inspection by the Tennessee Department of Health and Environment (TDHE) revealing serious environmental problems associated with past and present waste disposal practices at the Department of Energy (DOE) Y-12 facility, necessitate that expeditious and thorough investigative and remedial measures be taken. To this end, this MOU provides the actions agreed upon by the parties as constituting preliminary measures toward DOE achieving full compliance with all federal and state pollution control laws at its Y-12 facility. It is understood and agreed to by the parties that this MOU serves as a work plan for obtaining information, from which it is anticipated, further plans, actions and remedial programs will be developed. The plans, actions and remedial programs encompassed by this MOU shall be implemented in accordance with applicable regulatory requirements.

It is further understood and agreed that the compliance measures to be taken at Y-12 include but are in no way limited to those outlined herein. Furthermore, no party to this MOU in any way waives its rights to any other action or remedy available to it by law, nor is precluded from taking or requiring additional action with respect to environmental problems presently known to exist, or which may later be found to exist at this facility, nor shall the MOU constitute an admission of liability or a waiver of any defense.

Exhibit 7

To carry out the intent of this MOU the parties agree to take action with respect to each of the areas of the Y-12 facility, as those areas are further described in the March 8, 1983, TDHE Notice of Noncompliance with which all parties hereto are familiar.

I. Upper East Fork of Poplar Creek (EFPC) - also known as the "industrial ditch"

1. DOE agrees to submit to TDHE and to the Environmental Protection Agency (EPA), on or before May 31, 1983, a preliminary report containing the following information:

   a. A map showing all Y-12 discharges to upper EFPC;

   b. The effluent description of all Y-12 discharges to upper EFPC, including process description and flow quantification (process and cooling water); and

   c. Interim treatment/control measures - including treatment and/or elimination (provide plans and specifications as necessary as well as schedule for same).

2. DOE agrees to submit to EPA and TDHE an assessment of coal storage and steam plant management plans to include water quality impacts on or by July 29, 1983.

3. TDHE and EPA agree to review the preliminary report and meet on site to determine further needs and to submit comments to DOE on/or before July 1, 1983.

4. DOE agrees to submit a final report on/or before September 15, 1983, verifying the information described in 1.a. and b. above and designating the discharge points to be eliminated. A progress meeting will be held on or before September 15, 1983, to discuss waste water characterizations.

5. DOE agrees to provide to EPA and TDHE a final detailed waste water characterization by November 15, 1983.

6. DOE agrees to submit plans and specifications for all proposed interim treatment or control measures on or before December 15, 1983.

7. DOE agrees to submit all permit applications for the remaining discharges to EFPC on/or before December 15, 1983.

II. Pollutants Discharged from New Hope Pond (NHP)

1. DOE agrees to immediately take steps as outlined below to eliminate NHP as an NPDES discharge point.

2. DOE agrees to submit a report to EPA and TDHE on/or before July 1, 1983, containing:

   a. characterization of sediments in NHP;
   b. assessment of active sources of mercury contamination;
   c. plans and specifications for the NHP by-pass and its use for spill prevention and control; and

d. plans and specifications for cleaning out NHP.

III. New Hope Sludge Disposal Area

1. DOE agrees to submit to EPA and TDHE on/or before July 29, 1983, results of leachability tests.

2. DOE agrees to submit a report, on/or before August 31, 1983, evaluating site suitability and management practices.

IV. S-3 Ponds

The defined objective of the MOU is to cease all waste contributions to the S-3 ponds, and to eliminate the S-3 ponds as sources of contamination to surface and groundwater.

1. Elimination of waste contributions to S-3 ponds

On or before July 1, 1983, DOE agrees to submit to EPA and TDHE a proposal to cease all discharge of waste to the S-3 ponds. The proposal will include source description, waste stream characterization including chemical and radiological parameters, and volume/frequency of discharge. This proposal will include a management strategy for treatment elimination and/or containment of all waste currently entering the S-3 ponds with an implementation schedule for each descriptive category. Where appropriate, waste contribution elimination proposals will be implemented in an expedient manner.

2. Close out of S-3 ponds.

    a. DOE agrees to perform a definitive characterization of the S-3 ponds to be completed on or before July 15, 1983.

    b. On or before September 1, 1983, DOE agrees to submit a closeout proposal to include plans and specifications and implementation schedule.

3. Upon elimination of the S-3 ponds as a source of contamination to surface waters, DOE agrees to submit a plan and schedule for rehabilitation of Upper Bear Creek.

4. DOE shall establish on/or before July 1, 1983, a monitoring point at the discharge from the S-3 Ponds and establish the parameters to be monitored.

V. Burial Ground Oil Pond

1. DOE agrees to submit to EPA and TDHE on/or before November 1, 1983, a report to characterize wastewaters discharged from the pond and submission of NPDES application for the discharge.

2. DOE agrees to submit to EPA and TDHE on/or before January 31, 1984, a report to include:

    a. An inventory of waste deposited in the pond watershed;

b. A sediment assessment and inventory of existing contamination together with biological information regarding this area.

3. Based on parties' review and discussion of the report described in subparagraph 2, above, DOE agrees to take further appropriate action, which may include a plan for elimination of the sources of pollution to the pond and ultimate cleanup and closure of the pond.

VI. Isolation Area

DOE agrees to submit to EPA and TDHE on/or before January 31, 1984, an inventory of waste deposited in this area.

VII. Disposal Pits

1. DOE agrees to submit to EPA and TDHE a schedule for closure (including plans for alternate disposal) on/or before November 1, 1983.

VIII. Oil Land Farm

1. DOE agrees that, on or before November 1, 1983, it will:

   a. Implement a plan for preventing material from reaching waters of the State and United States, including interim erosion control measures by July 15, 1983; and

   b. Submit a description of runoff from this site; and

c. Submit an evaluation of alternative actions at this site, including establishment of an NPDES discharge point or ultimate cleanup and closure.

2. DOE agrees that, in the event it selects the alternative of establishing an NPDES discharge point under I.c., above, it will submit, on or before December 31, 1983, an NPDES permit application for this site.

3. DOE agrees to submit to EPA and TDHE, on or before January 31, 1984, a report that will include an inventory of material deposited in this area and an inventory of existing contamination.

IX. Contamination of East Fork Poplar Creek and Bear Creek

1. EPA, DOE and TDHE agree to establish and organize a Task Force to include representatives of TDHE, (with the Division of Water Management, TDHE, as lead), TVA, EPA, and DOE for the purpose of studying contamination and formulating a remedial plan if it is determined by EPA, DOE and TDHE that one is necessary. The roles and responsibilities of the task force members will be determined and agreed upon by the parties on/or before July 1, 1983.

2. The contamination study will include but not be limited to the following items:

   a. Definitive sediment and fishery study for Bear Creek and EFPC;
   b. Assessment and inventory of flood plain contamination;
   c. Multiparameter Pu, Hg, Pb, U, Th, Be, PCB Sediment Transport Study;

d. Ambient air sampling for Hg;

e. Assessment and management plan regarding urban development disturbance areas adjacent to EFPC and Bear Creek including:

   i. Distribution of dredge material for home landscaping, fill material and gardening.

   ii. List of commercial developers, including Corps §404 permittees; and

f. Public notification.

X. Groundwater Study for Y-12 Facility

1. On or before May 31, 1983, DOE, through its operating contractor, will award a contract to investigate the hydrologic characteristics of the Bear Creek Valley disposal areas (isolation area, disposal pits, oil pond and trenches and oil landfarm), the S-3 Ponds and the New Hope Pond sludge disposal basin. The purpose of the study is to evaluate the groundwater flow, monitoring data and the adequacy of the existing Y-12 groundwater monitoring program. It is expected that the results of this investigation will provide information to assess site conditions, determine if significant contamination to the groundwater has resulted from operations and assess the need and feasibility of corrective measures. If the contractor evaluates DOE's monitoring well network as being inadequate to fulfill the requirements of 40 CFR 264, 265 and 122.25, the contractor will recommend locations for additional wells and provide sketches and criteria for installation of the wells.

2. On or before June 30, 1983, DOE will submit to TDHE and EPA the contractor's plan of study.

3. EPA and TDHE will submit comments on the plan of study by July 15, 1983.

4. On or before December 31, 1983, DOE shall submit to TDHE and EPA the final groundwater study report.

XI. Master Monitoring Plan for Y-12

DOE agrees that, on or before July 31, 1983, it will submit to TDHE and EPA a master monitoring plan for groundwaters and surface waters of the entire Y-12 facility, indicating all present sampling locations and all parameters analyzed.

In the process of characterizing existing wastewaters, wastewater discharges, sediment and sludges of the areas mentioned, DOE will include sufficient analyses to determine whether or not such wastewaters discharged to, or sludges and wastewaters contained in, the areas are hazardous wastes as defined in EPA regulations at 40 C.F.R. Part 261. For those areas which are determined to contain hazardous wastes and which are to be closed, the plan for closure will incorporate the technical requirements for closure contained in Subparts G, K, L, M and N of 40 C.F.R. 264 and 40 C.F.R. 265, as appropriate.

The parties agree that all information required to be submitted by this MOU, and any other correspondence with respect to this MOU, is required to be given in writing, and mailed to each party as follows:

Mr. Howard D. Zeller
Assistant Regional Administrator
for Policy and Management
U.S. Environmental Protection Agency
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Dr. Michael T. Bruner
Assistant Commissioner
Tennessee Department of Health and Environment
T.E.R.R.A. Building
2nd Floor
150 Ninth Avenue, North
Nashville, Tennessee 37203

Mr. Joe La Grone
Manager, Oak Ridge Operations
U.S. Department of Energy
P.O. Box E
Oak Ridge, Tennessee 37830

Howard Zeller
U.S. Environmental Protection Agency

May 26, 1983
Date

Joe La Grone
U.S. Department of Energy

May 26, 1983
Date

Michael T. Bruner
Tennessee Department of Health and Environment

May 26, 1983
Date

ADM/kav D/3

U.S. DEPARTMENT OF ENERGY
P.O. BOX "E"
OAK RIDGE, TN 37830

DOENEWS:

JOE LA GRONE
Manager, Oak Ridge Operations
Department of Energy
Oak Ridge, Tennessee

Joe La Grone is the Manager of the Department of Energy's Oak Ridge Operations, a major field office of the Department.

La Grone was named Manager of Oak Ridge Operations on April 5, 1983 after serving as Manager of San Francisco Operations since August, 1978.

As Manager of Oak Ridge Operations, La Grone is responsible for programs and projects involving the production of special nuclear materials, including the enrichment of uranium and other related activities, and the administration of a broad range of production and research and development programs related to nuclear, fossil, and other energy initiatives. Oak Ridge Operations also was assigned overall responsibility for management of the Strategic Petroleum Reserve Project Office in June, 1983.

The combined activities of Oak Ridge Operations have an annual operating budget of $2.2 billion in Fiscal Year 1983 and are accompanied by a facility design and construction program of over $900 million for the same period. Revenues from these operations, primarily from uranium enrichment, will be $1.9 billion for the fiscal year.

From February 10, 1981 to October 5, 1981 he served in dual capacity as Acting Deputy Under Secretary and later as Acting Under Secretary. In September 1980 La Grone received a Distinguished Executive Service Award from the President. In 1981 he was recipient of the Department's Exceptional Service Award and was also presented an award for Special Act of Service by Secretary James B. Edwards.

La Grone is a 1959 graduate of Panola Junior College and was a 1961 honor graduate Magna Cum Laude of Centenary College of Louisiana. While at Centenary he received a Woodrow Wilson Fellowship and later pursued graduate studies at the University of Wisconsin in 1961-1962.

La Grone began his Federal career in 1962 as a management intern with the Atomic Energy Commission in Albuquerque and later held a number of positions in Washington, D.C. with the AEC. In 1972-1973 he was a Congressional Fellow. La Grone joined SAN in 1975 as an Assistant Manager.

A native of Deadwood, Texas he is married to the former Peggy McDaniel of Rockhill, Texas. They have three children - Paige, Dana, and Jeff - and live in Oak Ridge, Tennessee.

# # #

July 1983

Mrs. LLOYD. Thank you very much, Mr. La Grone, for your very fine statement. We appreciate your openness and candor and your willingness to get to the bottom of this very unfortunate situation and see that it does not happen again and to bring about remedial action.

I think one of the basic things that needs to be decided now in looking at really what happened is that there are significant differences among the DOE and the EPA and the State of Tennessee on their positions of the applicability of the Resources Conservation Recovery Act in terms of permitting DOE facilities and activities. What do you think really is the DOE's position on the applicability of the RCRA in regard to ways that ORNL the Y-12 plant, or the gaseous diffusion plant facility; do you feel that the DOE facilities must fully comply with all provisions of this act?

Mr. LA GRONE. Madam Chairman, that has been a matter of controversy and discussion and questions for some time, basically since DOE issued its original opinion on this matter a few years ago. I am aware that opinions have been issued elsewhere by Federal agencies. We have had those discussions with the State of Tennessee as well.

I would like to ask Jim Foutch, who has been working with the attorneys in Washington on this question, because there is a current discussion going on in Washington, I understand in counsel's office, around the question of applicability and are looking at that original opinion which has been our guideline since it was originally issued.

Mrs. LLOYD. I think basically you have stated it right, I think we could talk all morning about the applicability of the compliance. But would you proceed?

Mr. FOUTCH. Yes, ma'am. I will try to be very brief.

The situation is, in November 1980, our Office of General Counsel wrote to EPA and expressed what the Agency's position is, and I will be glad to submit that for the record.

Mrs. LLOYD. Without objection, it will be made a part of the record.

[The information follows:]

Department of Energy
Washington, D.C. 20585

NOV 14 1980

Mr. James A. Rogers, Esq.
Associate General Counsel
U.S. Environmental Protection
Agency
A-131
401 M Street, S.W.
Washington, D.C. 20460

Dear Mr. Rogers:

In a July 30, 1980 letter to you I called to your attention an issue regarding the applicability of EPA's hazardous waste management program established under authority of the Resource Conservation and Recovery Act (RCRA) (Pub. L. 94-580), to certain Department of Energy programs conducted under authority of the Atomic Energy Act of 1954 (AEA) (42 U.S.C. 2011 et seq.) This letter is intended to convey the position of the Department of Energy with regard to this issue.

Section 1006(a) of RCRA provides:

> Nothing in this Act shall be construed to apply to (or to authorize any State, interstate, or local authority to regulate) any activity or substance which is subject to...the Atomic Energy Act of 1954 (42 U.S.C. 2011 and following) except to the extent that such application (or regulation) is not inconsistent with the requirements of [the Atomic Energy Act].

The Department of Energy recognizes its statutory obligation to comply with all applicable Federal, State, interstate and local requirements, whether substantive or procedural, for the control and abatement of hazardous waste. It is DOE's policy to comply fully with the Congressional mandate contained in section 6001 of RCRA for all activities to which that statute applies. For the reasons discussed below, however, DOE believes that section 1006(a) of RCRA makes EPA's hazardous waste management regulations inapplicable to DOE activities performed under authority of the AEA.

As successor to the Atomic Energy Commission, DOE is directed by section 31(a) of the AEA (42 U.S.C. §2051(a)) to make arrangements for the conduct of research and development activities relating to:

(1) nuclear processes;

(2) the theory and production of atomic energy, including processes, materials, and devices related to such production;

(3) utilization of special nuclear material and radioactive material for medical, biological, agricultural, health, or military purposes;

(4) utilization of special nuclear material, atomic energy, and radioactive material and processes entailed in the utilization or production of atomic energy or such material for all other purposes, including industrial or commercial uses, the generation of usable energy, and the demonstration of advances in the commercial or industrial application of atomic energy;

(5) the protection of health and the promotion of safety during research and production activities; and

(6) the preservation and enhancement of a viable environment by developing more efficient methods to meet the Nation's energy needs.

DOE is also authorized and directed by section 41(b) of the AEA (42 U.S.C. §2061(b)) to "produce or to provide for the production of special nuclear material in its own production facilities." Section 91(a) of the AEA (42 U.S.C. §2121(a)) further authorizes DOE to perform research and development work in the military application of atomic energy, and to engage in the production of atomic weapons. These statutory provisions constitute the basic legal authority for DOE to engage in its various atomic energy activities. Accordingly, it may readily be seen that these activities are "subject to" the AEA within the meaning of section 1006(a) of RCRA.

The application of EPA's hazardous waste management regulations to these DOE atomic energy activities would be duplicative and inconsistent with the requirements of the AEA and with DOE's responsibilities under that statute, because the AEA itself establishes a regulatory framework by which DOE, as successor to the Atomic Energy Commission, is authorized to prescribe and enforce regulations and other requirements necessary for the sound management of its AEA activities. Section 161(i)(3) of the AEA (42 U.S.C. §2201(i)(3)), for example, authorizes DOE to prescribe regulations necessary "to govern any activity authorized pursuant to this chapter, including standards and restrictions governing the design, location, and operation of facilities used in the conduct of such activity, in order to protect health and to minimize danger to life or property." Paragraph (j) of the same section authorizes DOE, "without regard to... any other law," to "make such disposition as it may deem desirable of (1) radioactive materials and (2) any other property, the special disposition of which is, in the opinion of [DOE], in the interest of the national security...." In light of this broad regulatory authority conferred upon DOE by the AEA, any effort to subject DOE's atomic energy activities, especially activities involving the disposition of radioactive materials, to further regulatory requirements under the RCRA hazardous waste program would be duplicative and inconsistent with DOE's discharge of the responsibilities conferred upon it by the AEA.

Specifically, RCRA's authorization of any State regulatory power is inconsistent with the AEA to the extent that RCRA is interpreted to apply to any radioactive materials, because the AEA scheme for the regulation of atomic energy has been authoritatively interpreted as preempting any State regulation of radiation hazards which is not sanctioned by the AEA itself. Northern States Power Co. v. Minnesota, 447 F.2d 1143 (8th Cir. 1971), aff'd, 405 U.S. 1035 (1972). Accord, Train v. Colo. Public Interest Research Group, 426 U.S. 1 (1976), in which a unanimous Supreme Court at page 16 characterized Northern States, supra, as holding "that the AEA created a pervasive regulatory scheme, vesting exclusive authority to regulate the discharge of radioactive effluents from nuclear power plants in the AEC, and pre-empting the States from regulating such discharges." The applicability of the doctrine of preemption is generally dependent upon whether under the circumstances of a particular case a State requirement stands as an obstacle to the accomplishment of the Federal purpose. Northern States holds, however, that the regulatory scheme embodied in the AEA is sufficiently pervasive to preempt all State regulation of radiation hazards, regardless of factual circumstances, unless sanctioned by the AEA itself:

> [R]egulation of the radioactive effluents discharged from a nuclear power plant is inextricably intertwined with the planning, construction and entire operation of the facility....Congress vested the AEC with the authority to resolve the proper balance between desired industrial progress and adequate health and safety standards. Only through the application and enforcement of uniform standards promulgated by a national agency will these dual objectives be assured....In short, a dual system of licensing and regulation with control exerted by both the states and the Federal government over the level of radioactive effluents discharged from nuclear power plants would create an obstacle to the accomplishment and execution of the full purposes and objectives of Congress'. 447 F.2d at 1153-4.

Although the particular language cited above refers to preemption of State regulation of "radioactive effluents," the Northern States court and courts in successive cases have without exception viewed the AEA as preempting, except to the extent authorized by the AEA itself, all State regulation of radiation hazards generally. See, e.g., United States v. City of New York, 463 F. Supp. 604 (S.D. N.Y., 1978); Pacific Legal Foundation v. State Energy Resources Conservation and Development Commission, 472 F. Supp. 191 (S.D. Cal., 1979); Pacific Gas and Electric Co. v. State Energy Resources Conservation and Development Commission, 489 F. Supp. 699 (E.D. Cal., 1980). As the Northern States court stated, "Congress intended Federal occupancy of regulations over all radiation hazards except where jurisdiction was expressly ceded to the States [i.e., by the AEA]." 447 F.2d at 1150.

All of these cases involve State efforts to regulate commercial nuclear power plants. Accordingly, these cases in their analysis of Federal preemption focus upon the Federal interest associated with the commercial development of nuclear energy. Even more compelling, from the standpoint of preemption, is the Federal interest associated with DOE's AEA activities, which deal primarily with national security and the national defense. Thus, there can be no doubt that the AEA's preemption of State regulation of radiation hazards in the commercial context is equally preemptive in the context of DOE's atomic energy activities under any factual circumstances. There is nothing in RCRA itself or its legislative history to suggest that RCRA was intended to alter the preemptive aspect of the AEA regulatory structure, and we believe that the language of section 1006(a) of RCRA plainly disclaims any such intention. Accordingly, it is our view that radioactive materials produced in connection with DOE's AEA activities are not subject to regulation under RCRA.

Indeed, this same legal conclusion would appear equally valid for nonradioactive wastes produced by DOE's AEA programs, in view of the national security interests associated with those programs. Although section 3009 of RCRA provides that no State requirements may be less stringent than the EPA requirements, there is no comparable provision which would prevent any State from adopting requirements which are more stringent than EPA's. Both RCRA and the implementing EPA regulations provide that approvable state plans must be "equivalent to" and "consistent with" Federal requirements, but the fact remains, as EPA stated in its May 19, 1980, Federal Register preamble (45 FR 33385), that "States may impose requirements under their own laws which are more stringent than the Federal requirements". This possibility is further underscored by the new language added to section 3009 pursuant to section 14 of P.L. 96-482, the Solid Waste Disposal Act Amendments of 1980, which provides that "[n]othing in this title shall be construed to prevent any State or political subdivision thereof from imposing any requirements including those for site selection, which are more stringent than [EPA's] regulations." Such State requirements must be fulfilled by Federal agencies to the extent that section 6001 of RCRA is applicable. Failure or inability of a particular Federal or non-Federal facility to comply could result in the State's refusal to issue a RCRA permit, the consequent cessation of all hazardous waste treatment, storage or disposal operations at that facility, and perhaps even the closure of that facility.

Even conceding the probable good faith of all concerned State and Federal agencies, DOE anticipates that some States may prescribe hazardous waste requirements which could be unnecessarily restrictive but arguably not "inconsistent" within the meaning of section 123.32 of the EPA regulations. Any actual occurrence of this type which interfered with the conduct of DOE activities under the AEA would clearly be inconsistent with the AEA provisions discussed above, which provide sufficient direction and authority for DOE itself to manage those activities in an environmentally acceptable manner. The mere possibility of such an occurrence, measured against the national defense implications of the DOE activities, argues for recognition of the preemptive effect of the AEA regulatory scheme under any factual circumstances for nonradioactive as well as radioactive wastes. The breadth of the language employed by Congress in section 1006(a) of RCRA supports this view. Had the legislative intent been to apply that section's exclusionary effect only to radioactive materials, Congress could easily have chosen language having only that narrow effect. Instead, section 1006(a) is broadly drafted to exclude from RCRA's ambit "any activity or substance" (emphasis added) which is subject to the AEA, to the extent that the application of RCRA would be inconsistent. Accordingly, we believe that section 1006(a) of RCRA must be read in conjunction with the AEA to exclude nonradioactive as well as radioactive AEA program wastes from RCRA's coverage.

I wish to stress DOE's commitment to the sound management of all activities, including waste disposal, conducted under the AEA. DOE is currently in the process of issuing new environmental, safety and health management directives to replace the existing directives which were developed by DOE's predecessor agencies. The result of this process will be a series of Orders and supplemental chapters establishing policies and detailed procedures for meeting all of DOE's environmental, health and safety responsibilities including matters, such as occupational health and safety in atomic energy programs, for which DOE is independently responsible. As part of this effort DOE is presently studying EPA's new RCRA regulations to determine how best to assure that management of even those activities which we believe are not directly regulated by RCRA will achieve comparability with the intent of EPA's regulations. A staff of 350 Federal employees, including 275 stationed at field installations, are occupied full time in assuring that DOE complies with all applicable environmental, safety and health requirements. Their efforts are guided and monitored by DOE's Assistant Secretary for Environment.

DOE's record of performance in this area, particularly with regard to AEA activities involving occupational health and safety, has been exemplary. DOE's management of hazardous waste, including waste associated with AEA activities, will be designed to be equally successful.

Sincerely,

Stephen H. Greenleigh

Stephen H. Greenleigh
Assistant General Counsel
for Environment

Mr. Foutch. Very briefly, the situation is, because of the exemption that exists within the RCRA Act for Atomic Energy Act activities and substances, there has been continuing discussion over the last 3 years between EPA and DOE with regard to the applicability of RCRA to Atomic Energy Act activities. The Agency's position, as reflected in the memo, is that activities under the Atomic Energy Act are not subject to RCRA regulations by EPA, and therefore by the State.

I might mention, however, DOE does have its own program which follows RCRA and adopts EPA standards. It is DOE Order 5480.2, and it is titled "Hazardous and Radioactive Mixed Waste Management" and it specifically adopts an equivalent program for management of hazardous waste, equivalent to the RCRA program.

Mr. Gore. Will my colleague yield on that point?

Mrs. Lloyd. I yield.

Mr. Gore. I believe the nature of that dispute is—you correct me if I am wrong—is EPA says that the specific substances may be exempt but that the facility is not. Is it your position that a DOE facility which produces waste other than radioactive waste is exempt from the hazardous waste laws for all of those substances that are not radioactive? Is that DOE's official position?

Mr. Foutch. Mr. Gore, as I understand the official position, which is reflected in the document that I will submit for the record, we have two categories of hazardous substances. The key word is activities in the exemption language, as I understand the situation. The exemption speaks to AEA activities or substances, and the key word is activities, so the Agency's position is with regard to activities performed under the Atomic Energy Act, those are exempt from RCRA. Now we have many activities that we perform that are not subject—are not being performed pursuant to the

Atomic Energy Act, and we do have RCRA coverage for those, with EPA coverage.

Mrs. **Lloyd**. Mr. Gore?

Mr. **Gore**. So what you are saying is that under your interpretation—and I am given to believe that somewhere in DOE this is being reviewed and reassessed right now.

Mr. **La Grone**. That is our understanding as well.

Mr. **Gore**. Well I certainly hope that the reassessment comes up with a new and better interpretation, but the current interpretation is that even if a facility produces a hazardous chemical waste that is not radioactive and not one of the substances directly in mind when that exemption was written, that the entire facility and all those activities are exempt. It is my understanding that that is a matter which is now under review within DOE, and I again would simply express the hope that that review results in a substantial change. Otherwise, I believe that matter will have to be visited legislatively, but it can be solved if you all will change that interpretation at DOE and bring these facilities into compliance with the hazardous waste laws.

Mr. **Foutch**. You are exactly right, Mr. Gore, that is under consideration, under discussion between EPA and DOE, and I believe those discussions are continuing.

Mr. **Gore**. Well just be advised that the consideration will not end there if it does not result in an appropriate decision.

Mrs. **Lloyd**. A followup question, Mr. La Grone. Do you believe that DOE is cooperating with the Federal Environmental Protection Agency as well as the State environmental agency.

Mr. **La Grone**. I do believe that we are cooperating with the State of Tennessee and with the Environmental Protection Agency. When I met with Dr. Bruner and Mr. Zeller in Knoxville back in May, when we signed the Interagency Memorandum of Understanding, I pledged to them cooperation and that, if there were problems that came up in the working relationship under this agreement, please let us get the principals back together so we can understand what the problem is, share expectations with our staff, because it is going to be a long process that will go for 2 to 3 years. There will be honest differences, and people will disagree, but we should not let those get in the way of good working relationships.

Mrs. **Lloyd**. You feel that the Memorandum of Understanding is going to be the basis or will you look for further benchmarks as you do acquire more data?

Mr. **La Grone**. I see the Memorandum of Understanding as one part of it but not all of it. I think a part of that will be personal meetings between me and Mr. Zeller, Dr. Bruner, other State officials, to talk about the issues, to talk about ways to solve those problems.

Mrs. **Lloyd**. I hope that you have not haphazardly established benchmarks or standards that would not be consistent, but that would be looked at factually and not just precariously decided on.

Mr. **La Grone**. I believe the MOU represents very serious thoughtful benchmarks that will serve as a model for looking at other environmental issues that we have here at Oak Ridge or maybe elsewhere in the country, and that is part of our intent.

Mrs. LLOYD. One final question and I will yield to my colleague. Do you currently discharge any mercury pollutants into East Fork Poplar Creek or any stream in the Oak Ridge Complex?

Mr. LA GRONE. There is about 2 ounces, as I mentioned in my testimony, going out on a daily basis into East Fork Poplar Creek, coming out of New Hope Pond. This is from mercury deposited there in years past. If a pipe breaks, then there is more gallonage into the water, as there was a few weeks ago, or if there are heavy rains, that 2 ounces will go up to 3, I am told, based on some monitoring data. That is the mercury presently coming out of that site.

Mrs. LLOYD. Mr. Gore?

Mr. GORE. Thank you very much.

Mr. La Grone, do you feel that you currently have—that you now have an accurate picture of the mercury situation at Oak Ridge? Is your internal review of this matter and your review of your records sufficient to convince you that you have a completely accurate picture of the mercury contamination?

Mr. LA GRONE. Mr. Gore, it is not sufficiently accurate and complete to give you that assurance at this point in time. As I mentioned, I have asked the Inspector General's Office to look into six different areas around various reports, data that was furnished to other agencies which later some individuals have indicated may not have been complete data. I need to know what did happen with respect to those particular reports, and I need to understand a great deal more, before I am willing to testify before you or anyone that I know enough about the situation to say that I have a base line that I will stand on. I am still searching for information, too.

Mr. GORE. Well, as I told you personally, I feel that we and the citizens of Oak Ridge are fortunate to have you in charge and handling this problem because I personally am convinced that you are going to handle it effectively and responsibly and I look forward to working with you on it.

Now, each year, the Department of Energy, through the Oak Ridge National Laboratory, publishes an annual environmental monitoring report, and through the years various other reports on environmental quality, such as environmental assessments, have been similarly published. Some of the reports are presumably written by ORNL, but DOE reviews and has control over the final text of those reports.

Given what has come to light about the mercury problem, and DOE's state of knowledge during previous years, do you now believe that those reports presented an accurate assessment of the problem to the public?

Mr. LA GRONE. It is an impression at this point, if I could qualify it. That impression is those reports could have done a far better job in portraying the actual mercury situation in Oak Ridge.

Mr. GORE. Why do you think that happened?

Mr. LA GRONE. I do not know, very frankly.

Mr. GORE. All right. How about the other problems that have been referred to. Has there been an accurate picture of them presented to the public?

Mr. LA GRONE. Could I ask you to elaborate on that?

Mr. GORE. S-3, the waste oil burial grounds.

Mr. LA GRONE. It is a perception——

Mr. GORE. Compliance with the NPDES.

Mr. LA GRONE. It is a perception, not a fact, but let me share my perception in terms of why things about the S-3 ponds or burial grounds have not been shared more widely and openly.

I believe it had to do with operating styles in terms of individuals taking a posture of here we are as Federal servants, Federal employers with a responsibility not only to do program responsibilities but responsibilities to work with the community, to work with the State, to work with other agencies, and where we know there are problems or likely to be problems, to get out in front of that and share that information, to try to get some good input in terms of pros and cons, what are the options, what are the consequences and impacts. I do not believe that happened. I think that is why. As I say, that is a perception.

Mr. GORE. Let me take a specific. The December 1982 report entitled "Y-12 Plant Site Environmental Assessment," this report was published by DOE and makes the statement that there are no violations of State and Federal laws and regulations, and makes similar statements about the absence of problems at Y-12. Given what we now know about the mercury contamination and the State and EPA's concerns about the NPDES permits, concerns about the other matters we just discussed, the S-3 ponds and the oil disposal pits, and other problems at Y-12, do you now believe that those statements were accurate representations of the actual state of affairs?

Mr. LA GRONE. I believe that report is defective. That is why I asked the Inspector General to examine that report and determine what happened around it.

Mr. GORE. Who wrote that report?

Mr. LA GRONE. Mr. Gore, I do not know who authored that report.

Mr. GORE. Who reviewed it within DOE?

Mr. LA GRONE. I do not know that at this point in time either, but I plan to get that information from the Inspector General's Office in terms of the sequence of events.

Mr. GORE. All right, Madam Chairman, I would like to ask some questions briefly to some of the witnesses who have accompanied Mr. La Grone to the hearing.

Mr. Jerry Wing and Mr. H. D. Hickman. Mr. Wing, if the two of you would make your way to the witness table. If you all could stay there and just sort of slide toward the edge, I think we can probably squeeze two chairs in there.

Mr. Wing and Mr. Hickman, would you raise your right hand and repeat after me?

[Witnesses sworn.]

Mr. GORE. Now correct me if I am wrong. Mr. Wing, you are Chief of the Environmental Protection Branch at DOE, currently assigned to a task force dealing with this problem, is that correct?

Mr. WING. That is correct.

Mr. GORE. Mr. Hickman, you are the Assistant Manager for Defense Programs; is that correct?

Mr. HICKMAN. That is correct.

Mr. GORE. Mr. Wing, the report that I just referred to, the December 1982, "Y-12 Plant Site Environmental Assessment," did you have responsibility for reviewing that report?

Mr. WING. Yes.

Mr. GORE. How did it get by in that fashion, Mr. Wing?

Mr. WING. The report was completed about a year before it was published and underwent—while it was undergoing review in Washington—I believe that what that report says is a reasonably accurate picture of the conditions at the time.

Mr. GORE. Were you aware of the State's concern about the NPDES permit?

Mr. WING. When the report was written, they had expressed no concern.

Mr. GORE. No, at the time it was published. Were you saying earlier that you reviewed it a year before it was published?

Mr. WING. Yes.

Mr. GORE. Now there have been problems with the Resource Conservation Recovery Act for quite some time, have there not?

Mr. WING. There has been a question of applicability. I think what probably has not been understood is that along with the claim of an exemption goes the commitment to have a program compatible with RCRA. It is not that we would just turn our back on it. We would comply with the technical requirements of the act.

Mr. GORE. Well I think this is exactly where the problem is because the statement that there were no problems with State and Federal laws appears in the final analysis to have been based on your conclusion that you were exempt from those laws, but the impression conveyed by that statement—the statement was broad enough to leave the implication that there was compliance with the spirit of those laws, that the standards were being met, and in fact that is just not accurate. Do you want to clarify my assessment of that?

Mr. WING. To what extent do you believe it is not accurate, sir?

Mr. GORE. Well, take just one example; do the S-3 ponds comply with RCRA? And let us assume for a moment that RCRA does apply to the S-3 ponds, let us just assume for the moment that they do. Would they be in compliance?

Mr. WING. No.

Mr. GORE. OK, that is the point I am trying to make. There are other situations there which, if we assume that RCRA did apply, they would definitely not be in compliance, correct?

Mr. WING. If we assumed that, that is correct.

Mr. GORE. OK, now the statement that got to the public left the impression with the citizens of Oak Ridge and others that in effect there was compliance with these laws. Did it not sort of leave that impession?

Mr. WING. Well, you could read it that way. The question of the applicability of RCRA at that time was still, as it is to this day, unresolved. So it, in fact, is not in violation.

Mr. GORE. Yeah. Well that is the point I was trying to make earlier. At the bottom, the statement that there was no problem with State or Federal laws seems to have been based upon the interpretation of those laws which led you to believe that there was an exemption from those laws, but the impression conveyed, by saying there is no problem with the laws—it did not really say that, it did not really say there is no problem with the laws because we think we are exempt from the laws. The statement implied to the public that there is no problem with the laws because we have control of these problems and we are dealing with them in a responsible way. They are two different things.

Now the interpretation that we talked about earlier, about facilities and activities and whether or not hazardous wastes other than radioactive wastes that is coming from one of these facilities is exempt, you were the source of that interpretation, is that correct?

Mr. WING. Yes.

Mr. GORE. OK. And that worked its way up to DOE and became DOE's policy.

Mr. WING. There were several people that reviewed the report.

Mr. GORE. OK, who reviewed the report?

Mr. FOUTCH. Mr. Gore, if I may request clarification, I am not sure Mr. Wing understood the question, because the answer in my mind is no, to your original question.

Mr. GORE. All right, the question is—we were talking earlier about the interpretation of the act which exempts activities, and the current dispute between DOE and EPA is whether or not all discharges from facilities that conduct some activity, whether or not those other discharges are also exempt from hazardous waste laws.

Mr. FOUTCH. The question is were you the author of the Agency position on the AEA exemption from RCRA?

Mr. WING. Oh, heavens to Betsy, no.

Mr. GORE. Well it was our understanding—and you correct me if I am wrong, Mr. Wing—it was my understanding that although the conclusions were reviewed by others and that the formal position was drafted by others, the decision to interpret the law in that fashion, to interpret the word "activities" in that fashion, did originate with your——

Mr. WING. Negatory.

Mr. GORE. OK.

Mr. WING. No, sir.

Mr. GORE. Well I will stand corrected then. Where did it originate?

Mr. WING. DOE headquarters.

Mr. FOUTCH. DOE headquarters. If I may clarify, we had the opportunity to comment on the headquarters position at one point, but the interpretation—Oak Ridge was told this is our interpretation, do you care to comment? We commented and it was ultimately—I may be speaking out of school—our position was rejected.

Mr. GORE. OK.

Mr. LA GRONE. Mr. Chairman, could I ask a clarifying question?

Mr. GORE. Yes.

Mr. LA GRONE. Because I am getting a little confused between—are we talking about the 1982 report, as your original questions were, or are we talking about the generic question of the applicability of RCRA?

Mr. GORE. I am talking about the generic question of the applicability of RCRA. And I thought that the Environmental Division of

DOE at Oak Ridge was first to address that question and the first to—well, I will stand corrected then.

Now, the 1977 Elwood report—and I just have a couple of more questions—the 1977 Elwood report made several recommendations on how to deal with the mercury problem. What was your response to those recommendations, Mr. Wing?

Mr. WING. To the final report?

Mr. GORE. To the draft report.

Mr. WING. Your staff has a copy of my comments on the report, sir. I felt that this draft was a good status report describing the situation. I felt that it needed some improvement. In my comments back to Jerry Elwood on the draft report, as I recall, the letter says several of those recommendations are already being pursued. As I recall, one related to the manner in which the sample from New Hope Pond was analyzed. That recommendation was followed up on. As I recall, most of them were. One that asked for, or recommended, an extensive study of the sediment in the pond, is that in that particular report?

Mr. GORE. Yeah. Now, it was your recommendation that that be classified as business confidential, is that correct?

Mr. WING. I simply agreed with the manner in which it was classified when it came to me. It came to me as business confidential and I am just agreeing that, fine.

Mr. GORE. I see. Now——

Mr. WING. The final report was not, by the way.

Mr. GORE. Well the final report had substantial changes, did it not?

Mr. WING. Not as far as my comments were concerned.

Mr. GORE. But from the draft.

Mr. WING. Not that I recall—not that I would call substantial changes. They removed a person's name from the report.

Mr. GORE. I see. Now you say in your memorandum—and I think we ought, without objection, to put it in the record.

Mrs. LLOYD. Without objection, it will be made part of the record.

Mr. GORE. This is a memorandum to Jerry Elwood from you, and we will provide you with a copy of this if you like. I will just read you the parts that I am dealing with. "From a public information standpoint, it is requested your report remain business confidential with the distribution not to exceed those on the list provided." I guess what I am getting at is this, this was the first formal report noting the extent of the mercury spill, and it was—and this was the decision—if I am wrong, correct me, I am quite anxious not to be unfair in any way. But this appears to be the decision not to disseminate this beyond the people noted on the memorandum back in 1977.

Dr. BIBB. I think what that technical data did was talk in terms of guidelines, FDA guidelines on fish, and I do not think that really related to the spill or should be related to any data on the spill. That was not a report on the spill. It was a technical monitoring report on mercury content in fish.

Mr. WING. That is right.

Mr. GORE. Why was that sensitive? I mean it talks about the extent of mercury contamination with the amounts found, you know, here, there and—in the fish, et cetera. Why would that be kept from the public?

Dr. BIBB. Well I cannot answer why it was kept from the public, but, in the area of why would it be sensitive, clearly that we are going to have to have someone else, other than DOE, really look at that data to decide what that means, because all we can say is that it meets or does not meet some FDA guideline.

Mr. GORE. Well, you were not here at the time, were you, Mr. Bibb?

Dr. BIBB. No, sir.

Mr. GORE. I am, you know, sincerely interested in knowing why this was not made available to the public. I mean, it seems to me it should have been.

Mr. WING. I will be happy to try and clarify it for you, sir.

I became aware—OK, in the summer of 1974, I had a summer student doing sediment sampling in East Fork and other streams on the reservation. It was in September that his report became available to me, when we first could begin to see signs of mercury contamination. I asked Y-12 to get—this was in November 1974—I asked Y-12 to get samples of anything in East Fork that could get in the human food chain, to evaluate the seriousness of the contamination. They met with folks from Oak Ridge National Laboratory and laid out a sampling plan.

The first fruits of that sampling plan came to me in late 1976, before ORNL's fish sampling was completed, or perhaps early 1977. It was before the report ever came out.

In May 1977, I and two others went to TVA in Chattanooga, with the data that we had, the sediment data—no, it was the fish data—to discuss it with them. We felt——

Mrs. LLOYD. Mr. Wing, may I clarify something at this time—and interrupt.

Are you saying that this report was a preliminary report in which you were going to ask for additional studies to clarify the report to a greater degree, the fish sampling, the studies that had been made.

Mr. WING. Yes, ma'am, that essentially is the tenor of the comments that I provided on the draft report. But we took——

Mrs. LLOYD. You were looking for specific studies to define the extent of the environmental contamination, is that correct?

Mr. WING. We wanted to get reliable data upon which to make some kind of——

Mrs. LLOYD. This is a preliminary study to identify the need for further studies, is that correct?

Mr. WING. It could be looked upon that way, yes. We took the——

Mr. GORE. Did you look upon it that way?

Mr. WING. We took the data to TVA to try and get their opinion, based on their wide expertise. We asked them to include that area in their reservoir surveillance program. They said they would think about it, they had some upcoming budget meetings and they would get back to us.

As time went on, we supplied more data to them. At one point, they agreed that they would include it in their surveillance program, and then they changed their mind and said, based on the extensive data base that we had provided, they saw no need to do any more sampling in 1978.

Well, at that time, the timeframe we are talking about, 1977-78, we have a report from Oak Ridge National Laboratory that I felt was really a good status report, but it needed more sampling. We have an opinion from TVA that they really did not consider it to be all that big a problem. It was no different, and perhaps less, than the fish levels in the Pickwick Reservoir at that time, which was a commercial fishery.

So we were kind of biding our time, waiting for reliable information. The next—we had in the 1977 environmental monitoring report, a paragraph or so about the mercury contamination.

Mr. GORE. Let me ask you this, specifically the recommendations of the Elwood report are (1) studies should be initiated to identify the sources and speciation of mercury in the East Fork Poplar Creek, Bear Creek, Poplar Creek, and the Clinch River by determining the spatial distribution of mercury associated with sediments of selected size fractions and organic content in these environs. It is suggested that mercury associated with surface sediments be mapped in detail in New Hope Pond, the East Fork Poplar Creek, Bear Creek and Poplar Creek, above and below the confluence with the East Fork of Poplar Creek and the Clinch River, above and below the mouth of Poplar Creek. This was the recommendation to you in 1977.

That was not done, was it?

Mr. WING. To whom was that report addressed, sir?

Mr. GORE. To—well, when I say you, I do not want to single you out, Mr. Wing, this was the recommendation to the DOE and specifically addressed to Mr. C. R. Richmond, Associate Director for Biomedical and Environmental Sciences at ORNL.

Mr. WING. Yes.

Mr. GORE. Did you advise them to undertake these recommendations?

Mr. WING. That particular recommendation concerning a spatial study of distribution of mercury in sediments in New Hope Pond, I personally felt, could contribute nothing to the understanding of what was going on.

Mr. GORE. How about the rest of them? There are a number of recommendations here. I will not read them all, because they are lengthy, but there are five specific lengthy recommendations, and they just were not followed up on.

Mr. WING. One concerns cow hair, is that correct?

Mr. GORE. Well there are a lot of them that were not—that were just not followed up. I mean—and partly as a result, we are still in a position now where the data is inadequate. I guess—I mean, my purpose is not to put you personally on the hot seat, Mr. Wing, but we are trying to identify exactly what went wrong in this situation and it does seem to me that when we have back as far as 1977, the first report of the extent of the contamination and specific recommendations to get on track toward getting the information we needed at that time to get a handle on it and develop a strategy to deal with it, it just seems to me that it was a missed opportunity.

I will give you an opportunity to comment on that assessment, if you like.

Mr. WING. Those recommendations which we felt could help the situation we undertook.

Mr. GORE. Well, then I guess it is in the nature of the decision-making process, specifically the decision as to what would help and what would not help, and I think that speaks to the institutional arrangement. If you have the source of the problem making value judgments about what is necessary to determine the extent of the problem, it obviously is just not adequate and the institutional arrangement has just got to be changed.

Now in the 1982 ORNL report on mercury in the East Fork of Poplar Creek, Dr. Van Winkle recommended that the East Fork of Poplar Creek be closed to fishing. This recommendation to close it to fishing was in the draft but in the final report that recommendation was deleted.

Mr. WING. I believe you are referring to the 1977 report, sir.

Mr. GORE. Well what about the 1977 report then, the 1977 report under specific actions—oh, OK, this recommendation was not made to the State at that time. Subsequently, the State did post the facility.

Mr. WING. That is correct.

Mr. GORE. But was this recommendation removed—was it made to the State at that time, at the time the report was released?

Mr. WING. No.

Mr. GORE. Why not?

Mr. WING. We still do not feel that it is a threat to public health and safety.

Mr. GORE. Well, I am talking specifically now about posting the East Fork of the Poplar Creek.

Mr. WING. Yes, sir.

Mr. GORE. About the fish, now, and Mr. La Grone said in his statement a moment ago that the principal threat is that possibly somebody is going to ingest the fish that may have metholated mercury, and yet that recommendation was not made.

Was it your decision to delete that recommendation, to not make it to the State?

Mr. WING. Not that I recall.

Mr. GORE. You said that—let me back up. You said a moment ago that you do not think there is a problem.

Do you think there is a problem with the fish now?

Mr. WING. No.

Mr. GORE. Do you think that the State's decision to post the East Fork was in error?

Mr. WING. It is their judgment.

Mr. GORE. Had it been your responsibility, had you been in the position in the State Environmental Branch, would you have not posted it?

Mr. WING. I do not think I could answer that question.

Mr. GORE. What are the purposes of these reports if they had specific recommendations? I mean, it seems to me the purpose of a report of this kind is to follow up on the recommendations. Would you not agree? I mean, does that not seem reasonable?

Mr. WING. No, sir.

Mr. GORE. Tell me why not.

Mr. WING. A recommendation, in my judgment, is simply the professional opinion of the author and the recipient is not necessarily bound to agree or disagree.

Mr. GORE. Well, I think probably a lot of people here disagree with your analysis of it, but, again, I just think there were some missed opportunities and our purpose is to move on from here to find out how we can effectively solve these problems and prevent them from recurring. And I think obviously some institutional changes are going to have to be made.

Now, Mr. Hickman, you have responsibility for the Y-12 plant with DOD; is that correct?

Mr. HICKMAN. Not with DOD. I do have responsibility for the overall operation of the Y-12 plant, reporting to Mr. La Grone.

Mr. GORE. OK. Now that is not——

Mr. HICKMAN. We do not have direct contact with the Department of Energy—or, Department of Defense. From the standpoint of our contacts are with and through primarily the Albuquerque Operations Office, which has overall responsibility for management of the DOE nuclear weapons program. We do not have direct contact with the Department of Defense.

Mr. GORE. Thank you for clarifying that.

My question is this: If you have responsibility for the plant and that is where the mercury is coming from, what responsibility do you have to deal with the mercury and to make certain that it does not become a problem?

Mr. HICKMAN. OK. Let me——

Mr. GORE. And what responsibility do you have to make certain that the public is adequately informed?

Mr. HICKMAN. Let me see if I can explain that to you. The way we are organized in the Oak Ridge Operations Office, we have basically what is called a matrix type organization, in which, on my immediate staff, I do not have people who are experts in the area of health, safety and environmental protection. We rely on the expertise in our Environmental Protection, Health and Safety Organization.

I view my responsibility as making every effort that I can to implement changes that are recommended by that organization and approved by higher management.

Mr. GORE. So the environmental responsibility, as you see it, rests with DOE; is that correct?

Mr. HICKMAN. With DOE, yes.

Mr. GORE. And with the Environmental Assessment Branch at DOE, specifically?

Mr. HICKMAN. Well, I think we have—if you are talking about overall responsibility, I think I would have to share that overall responsibility, but I must rely on experts to define for me if we have a problem and what we should do about the problem.

Mr. GORE. Well, you have got five copies of the report back in 1977 when it came out; correct?

Mr. HICKMAN. Yes, sir.

Mr. GORE. Did you discuss it with Mr. Wing?

Mr. HICKMAN. As I recall, copies were forwarded to Mr. Wing.

Mr. GORE. Did you discuss it with Mr. Wing?

Mr. **Hickman**. I do not recall if we specifically discussed it at that time.

Mr. **Gore**. Well, see, that is really the question that I am getting at. You are in charge of the plant, you get a report back in 1977 that tells you about the mercury contamination, and here we are 5 years later. What I am trying to get at is, do you feel—and I am aiming this toward the future now—do you feel if a problem like this occurs, you share in the responsibility? Do you have a responsibility to take the initiative and discuss it with the folks who are supposed to be dealing with the consequences of a situation like this?

Mr. **Hickman**. Well, I am not sure that we did not discuss it. I do not recall specifically discussing it. But that does not mean we did not, because that is 6 years ago, and my memory is not that good.

Mr. **Gore**. Well, OK. I am going to wrap up, and I do want to apologize to the other witnesses who are waiting, because I have taken too much time with this panel. And I guess the basic question is: 5 years ago, we have a report on the extent of this problem and it went to you, and everybody that is supposed to have responsibility for this was fully informed, and yet nothing was done. And I guess we need to find out why nothing was done if we are going to make certain that any future situation like this is handled in a different fashion.

Mr. La Grone?

Mr. **La Grone**. If I may offer a couple of comments, sir.

Mr. **Gore**. Yes.

Mr. **La Grone**. I mentioned earlier—you asked me a question in terms of why I thought this might have happened, and it was a matter of perceptions. I still feel, as a perception, in the absence of hard facts, the Elwood report was mentioned along with the data furnished to TVA—those are two areas I have asked the Inspector General to give me an independent review in terms of what happened and why, in terms of trying to isolate that particular matter to satisfy me that we did or did not do the right thing.

In terms of program managers being responsible for safety, let me say that my philosophy and the philosophy that I am trying to engender in this organization is that a program manager is responsible not only for programs but is also responsible for safety and the environment, as well. Obviously, we have to have a support organization in the organization. They simply cannot be cops out checking on people. Safety and environmental responsibilities start with the same people who must execute those programs.

Mr. **Gore**. Well, let me conclude by saying, again, Mr. La Grone, that I have the utmost confidence in your ability and your determination to make the changes that are necessary to put this problem behind us and make absolutely certain that the problem which led to the failure to be candid with the public and the failure to deal effectively with the problem are going to be solved, and we are going to, of course, continue to work with you and to pursue this matter, and I believe we are on the road to making certain there is no repetition of something like this.

Mrs. **Lloyd**. Thank you, Mr. Gore.

Just a couple of follow-up questions, Mr. La Grone. In an effort to put this behind us and look to the future for better relations and openness on the part of DOE and EPA and the State of Tennessee, do you feel that the water in the city of Oak Ridge is contaminated in any way from the discharges from the Oak Ridge complex, Mr. La Grone?

Mr. **La Grone**. I have asked that question, and the assurances I have received are that that water is not contaminated, because it is withdrawn at a source above where our plants are discharged.

Mrs. **Lloyd**. Do you know of any member of the public, to your knowledge, who has exhibited any sign of sickness due to the mercury contamination? Have workers unconnected with the Y-12 facility exhibited any effects of mercury contamination?

Mr. **La Grone**. Not to the best of my knowledge, Madam Chairman. I am familiar with some recent publicity around a case involving a gentleman named Wilson. I understand that the U.S. district court issued a ruling on that case in 1971 or 1972 and ruled against the individual bringing the case. The allegations around that, as I recall, were mercury poisoning encountered while working at Y-12, but it is my understanding the court ruled against that. But, to the best of my knowledge, I am not aware of other cases of mercury poisoning.

Mrs. **Lloyd**. This was an isolated case, to the best of your knowledge, Mr. La Grone?

Mr. **La Grone**. I hesitate to even say isolated case. As I say, it was ruled on in the court based on the merits that were presented.

Mrs. **Lloyd**. As a case to be ruled upon?

Mr. **La Grone**. I am not aware of any cases to be ruled upon, to the best of my knowledge.

Mrs. **Lloyd**. Mr. La Grone, you stated that in 1975, the president of Union Carbide nuclear division, Mr. R. F. Hibbs, sent a letter to Mr. Hart, the former Manager of DOE Oak Ridge Operations, noting that fish were contaminated with mercury in excess of the FDA guidelines and that further monitoring and samples were necessary.

If the office was informed in 1975 that fish were contaminated with mercury in excess of the FDA guidelines, why was not action taken to limit fishing at this time? Why did it take so long for the requested monitoring and sampling program to be authorized and reported in June 1977?

Mr. **La Grone**. Madam Chairman, if I could offer a clarification for the record, I believe that that may have been taken from another statement that has been presented to the committee for presentation here today.

Mrs. **Lloyd**. OK. Well, I said that as a followup to what I was really referring to.

Mr. **La Grone**. Let me make one comment, if I may. If such a letter was exchanged, someone should have followed up on it and insured that action was taken.

Mrs. **Lloyd**. I have a letter from Mr. Brooks, Chief, Water Control and Ecology Branch for TVA, suggesting that you reappraise the situation in January 1979, to determine the need for any additional sampling at that time, March 1978.

Mr. **La Grone**. That has to do with fish data?

Mrs. **Lloyd**. That is correct.

Was this sampling followed up on, to the best of your knowledge? Any of you gentlemen on the panel.

Mr. WING. The last letter that we received from TVA was from Ralph Brooks, if I remember correctly.

Mrs. LLOYD. That is correct.

Mr. WING. And it—is that the one that says, "Based on the extensive data base you have provided, we see no reason for additional sampling in 1978"?

Mrs. LLOYD. Yes.

Mr. WING. And it says they would be back in touch with us.

[Document presented to Mr. Wing.]

Mr. WING. Right. "I suggest we reappraise the situation in January"—I suggest we, TVA—"reappraise the situation in January 1979 and determine need for any additional sampling." This is the last letter we ever received from him.

Mrs. LLOYD. To the best of your knowledge, there was no follow-up work done?

Mr. WING. Oh, we continued to sample, of course.

Mrs. LLOYD. Did TVA continue to sample?

Mr. WING. I do not know.

Mrs. LLOYD. Thank you very much.

Thank you, gentlemen, very much.

Mr. GORE. Madam Chairman, may I ask one more brief question?

Mrs. LLOYD. Yes.

Mr. GORE. Mr. La Grone, there have been some suggestions by some that if we are going to really get on top of this situation, that there might be some usefulness for outside peer review of some of the additional scientific studies related to mercury contamination and so forth in order to just convince people that we are absolutely determined to get on top of it and restore the credibility of DOE's ability to handle this problem.

How do you react to that suggestion?

Mr. LA GRONE. I react favorably. I believe there are advantages to having outside scientifically technically qualified people to review the work that has been done in terms of making assessments. I believe that can be further shored up by holding some public meetings to discuss the findings and give the community an opportunity to hear, to input, and to raise questions.

Mr. GORE. That is excellent. Thank you, Madam Chairman.

Mrs. LLOYD. Thank you, Mr. Gore.

Thank you very much, Mr. La Grone, for your testimony. And the gentlemen who are with you, thank you also for your help this morning.

Mr. LA GRONE. We appreciate the opportunity.

Mrs. LLOYD. Thank you very much.

Our next witness is Howard D. Zeller, Assistant Regional Administrator for Policy and Management, U.S. Environmental Protection Agency.

Mr. Zeller, would you come forward, please? Mr. Zeller, we have your prepared statement, and without objection your entire statement will be made a part of the record at today's hearing. You may proceed as you wish. If you would stand and identify your witnesses, Mr. Gore will swear you in.

Mr. GORE. Excuse me. The reporter cannot hear you introducing them. Maybe you should sit down and then we will swear you in.

Mr. ZELLER. On my left is Arthur Linton, who is the Federal facility coordinator for the Environmental Protection Agency, Southeastern Region; on my immediate right is Mr. Jay Sargent, who is regional counsel for the Southeastern Region, Environmental Protection Agency; and further on my right is Mr. Douglas McCurry, who is a senior staff member in the RCRA permitting program in the Environmental Protection Agency.

Mr. GORE. OK. Would you stand and be sworn, please?

[Witnesses sworn.]

Mrs. LLOYD. Mr. Zeller, please proceed with your testimony.

STATEMENT OF HOWARD D. ZELLER, ASSISTANT REGIONAL ADMINISTRATOR FOR POLICY AND MANAGEMENT, SOUTHEASTERN REGION, U.S. ENVIRONMENTAL PROTECTION AGENCY, ACCOMPANIED BY ARTHUR LINTON, FEDERAL FACILITY COORDINATOR, SOUTHEASTERN REGION; JAY SARGENT, REGIONAL COUNSEL, SOUTHEASTERN REGION; AND DOUGLAS McCURRY, SENIOR STAFF MEMBER FOR RCRA PERMITTING, EPA

Mr. ZELLER. Good morning. My name is Howard Zeller, and I am the Assistant Regional Administrator of the Southeastern Region for the U.S. Environmental Protection Agency. Our offices are in Atlanta, Ga.

I have come to Oak Ridge today to present information on environmental problems at the Y-12 facility which is operated by the Department of Energy at Oak Ridge. This is one of several operating facilities under the responsibility of the Department of Energy.

The environmental problems at Y-12 which are discussed in my statement are serious and require that immediate remedial measures be put into effect. However, based on the present level of information, we are not aware of any imminent threat to human health. A final decision cannot be made until additional studies have been completed at this site.

EPA's regulatory authorities for environmental quality control at Oak Ridge are found in the Clean Water Act, the Clean Air Act, the Safe Drinking Water Act, the Resource Conservation and Recovery Act, the Comprehensive Environmental Response, Compensation and Liability Act—that is, of course, Superfund—Toxic Substance Control Act, and Executive Order 12088, which is Federal Compliance with Pollution Control Standards. These authorities appear to be clear and adequate to achieve compliance at Federal facilities.

It is the position of the Environmental Protection Agency that nonnuclear wastes at DOE facilities are subject to the same regulatory requirements under applicable environmental laws, both substantive and procedural, as any other regulated entity, unless these requirements are inconsistent with the requirements of the Atomic Energy Act.

The Executive order deals primarily with EPA's role in working with Federal agencies and includes how we interface with other Federal agencies and how we interface with the Office of Management and Budget. The Tennessee Department of Health and Environment also has legal authority and can regulate federally owned and operated facilities. A portion of my statement is committed to those programs which have been delegated to the State, and unless you have specific questions, I will defer that for the record and proceed with a discussion——

Mrs. LLOYD. Thank you very much. That is fine with us, Mr. Zeller. We will defer those questions to Dr. Bruner when he testifies.

Mr. ZELLER. Thank you.

I would like to say at this time, the State of Tennessee and EPA have already been heavily involved in working together at the Y-12 facility. While we were aware of some of the environmental problems, our attention was really drawn to these problems on the February 23 compliance evaluation inspection made by the Tennessee Department of Health and the Environment.

Following that compliance evaluation inspection, I had a consultation with Dr. Bruner and other staff members of the State. We agreed the problems were serious, and I arranged for an immediate meeting in Atlanta. That was held on April 8, for the State, DOE and EPA to meet and discuss these problems and discuss the strategy for resolution of these problems. We ultimately culminated that meeting in a memorandum of agreement which was finalized on May 26, 1983, signed by all the parties, and it addresses compliance with these facilities.

I believe the MOU is a good blueprint and good strategy to get the necessary data which will aid in the development of remedial measures. I feel once this is accomplished, we will reissue the NPDES permit, close out hazardous waste sites, and we may have possible hazardous waste permits to be issued.

Now, I would like to address very briefly the problems, all of the problems that we have identified at Y-12, our status at the present time, and how I believe we can accomplish what we need to accomplish.

I have identified seven problems, seven areas of environmental concern at Y-12. These include, first, the need for reissuance of the NPDES permit.

We are concerned about the pollutants discharged from New Hope Pond and the disposal of both past and present. We are concerned about the S-3 ponds, the discharges and the potential contamination of ground and surface water. We are concerned about improper disposal of PCB contaminated soils, and we are concerned about the contamination of East Fork Poplar Creek and Bear Creek from the mercury spill which has been mentioned previously. We are concerned about the unknown extent, degree and characterization of ground water contamination. And, finally, we are concerned about the radioactive discharges to the environment and the extent of that impact.

Of these seven problem areas that I have mentioned, I believe that the most serious problems are the discharge of mercury as well as the potential for possible ground water contamination.

Mrs. LLOYD. That is the overriding problem for the area?

Mr. ZELLER. I think it is a very large part of the problem. But I think there are other very large problems too, as I have already mentioned, and I will go into some detail.

Mrs. Lloyd. That is the overriding problem?

Mr. Zeller. Yes.

Mrs. Lloyd. Please proceed.

Mr. Zeller. First of all, let me address the NPDES permit and the need for reissuance of that permit. Before we can adequately do that, we have to have some initial information on chemical waste characterization on the discharge and effluent descriptions, we need process descriptions, we need flow quantification, interim treatment measures and a great deal of information before we can properly issue that permit.

At the present time, we have identified somewhere in the neighborhood of about 200 discharges going into East Fork Poplar Creek. Only a small percentage of these contain process waste, and we simply have to sort out and segregate all those discharges, find what is being discharged and deal with this on a pipe-by-pipe basis. To do that, we have to have the studies that I mentioned, some additional chemical studies and a revised permit application. We expect to have that by December 15 and expect to have that permit issued by about the first of the year.

On New Hope Pond, it has been and is presently serving as an on-stream wastewater treatment device. It is a settling pond for solids being carried by East Fork Poplar Creek from the Y-12 facility. It has been agreed that this pond will be closed down and eliminated as an NPDES discharge point. We asked for in the MOU, and received a report on July 1, relative to the characterization of the sediments in New Hope Pond. The report also provided an assessment of all the active mercury sources, the plans and specifications for bypass, and use of the pond for spill control, and plans and specifications for dredging and disposal of sediment.

We additionally asked for a characterization of the wastes that were dredged from the New Hope Pond in, I think, 1973, and disposed of at a site called Chestnut Ridge. We are concerned that this may have been improper waste disposal, that we may have leaching at the site, and we may have a need for certain requirements under RCRA to control this activity.

Let me mention very briefly the S-3 ponds. I have already mentioned those on several occasions. We consider this to be a serious problem at the site. The S-3 ponds are four unlined, interconnected ponds. They are holding and treatment devices for plating sludges, plating solutions, nitric acids, hydrochloric acids, stripping and cleaning solutions, mop water, which has traces of radioactive contaminants, halogenated solvents and other wastes. They leak badly and the material gets into the East Fork Poplar Creek and into Bear Creek. Under the memorandum of agreement we asked that these ponds be closed out immediately and no longer utilized as a source of waste disposal.

We have just recently received a proposal from DOE, as was mentioned, and we are presently reviewing this proposal. Let me say generically it involves transport of this waste to another treatment facility at K-25, which is an activated sludge treatment plant. We are evaluating the feasibility for transporting these wastes that have been going into the S-3 ponds to this facility until we can get those wastes characterized, get those ponds cleaned up and closed out properly.

The next issue I would address would be the PCB disposal. Waste oils and solvents were buried in the ground and poured in trenches, and it created a problem. A problem has developed with leaching, the oils coming from the trench where they were disposed of, and being collected in another pond.

We need to determine the levels of PCB's. If they are high enough to require removal under the Toxic Substance Control Act, which is 50 parts per million, they will have to be disposed of at a proper disposal site. Otherwise, I think we would probably approve disposal in the incinerator which was referred to previously by Mr. La Grone, which may be adequate for managing these PCB wastes once they are quantified and identified.

The pond that is collecting these wastes should probably be left in place because it is serving as a treatment site. This would be covered under the NPDES permit.

The next issue that I want to talk in some depth about is the contamination of East Fork Poplar Creek and Bear Creek with the mercury spill. I would like to point out that the time period, 1955 to 1968, is when the huge quantities were released. According to Mr. La Grone, 4,700 pounds were lost to the creek. I think it is important to point out that we had no knowledge of any mercury spills in this area until November 1982, and we had no information on quantities until May 1983 when that classified report was released. The magnitude of the release is very significant.

The sediment tests that have been performed show what we would expect them to show—East Fork Poplar Creek and Bear Creek sediment is highly contaminated. The sediments in New Hope Pond are highly contaminated with mercury and other compounds. The fish collected immediately in that area are also contaminated, higher than FDA limits, and it was proper that that area be closed to fishing.

Mrs. Lloyd. Fish in what area?

Mr. Zeller. In the East Fork Poplar Creek area in the vicinity of the plant. I do not know the exact mileage.

But as an approach to this problem, under the memorandum of agreement, we established a task force of TVA, EPA, Department of Energy and the State, and the State is the leader in this venture, to look at all of these problems and to come up with the kind of information that we need.

The spill occurred a long time ago. We need to have information on where that mercury is at the present time: Are there certain areas where it is concentrated? Has it moved downstream? Where is it in the sediments? What is it doing to organisms in the area? I think we agree at the present time, based on the downstream sampling done by TVA, who established in over 100 fish that they collected from Watts Bar and the Clinch River—that levels of mercury were well below the FDA limit. So there is not an immediate threat to the fish at the present time.

But we do not understand whether we are on the up side of the cycle or the down-side of the cycle, or whether we are at equilibrium with the level of contamination. It will take a lot of good, solid data before we can make that determination, before we can make any decisions, in my opinion, relative to any cleanup or any efforts that need to be made. The task force will develop that information, and the MOU addresses that.

Moving very quickly to the ground water, this is another area of significant concern to EPA. We would expect, and there is, some ground water contamination in the vicinity of the S-3 ponds and other areas. This is what one expects to find in waste disposal sites of this nature. The overall concern that we have is what is the extent of ground water contamination in the entire Oak Ridge area. Do we have a plume or movement of the contamination? What kind of levels, if any, do we have? What is the problem in ground water? And we need to assess that problem very, very badly.

Under the memorandum of agreement, the Department of Energy has awarded a contract to a major contractor to do this study. We are reviewing that contract and we expect to comment back to them on the adequacy of their proposal and proceed in an objective, professional manner to find out what the problem is, and, if necessary, we will look to any mitigating measures that may be required to resolve this. It is too early to say at this point in time because we are still studying the proposal.

On the radioactive discharges, airborne emissions are accumulated throughout the year for radionuclides. The major gaseous wastes from Y-12 are uranium 234 and 238.

As has been mentioned previously, under the Clean Air Act, EPA has proposed putting radionuclide limits on airborne emissions from DOE facilities. The Oak Ridge reservation, including Y-12, was among a group of 13 facilities with higher emissions and was studied in more detail.

At the Oak Ridge site, the calculated highest doses to nearby individuals are caused mostly by particulate emissions and if the proposed new standard is promulgated, DOE must either demonstrate compliance or upgrade their emission control.

The liquid radioactive wastes are stored on site in tanks and are not released until they are taken away for ultimate disposal.

I will begin to wrap this up by saying that EPA believes that RCRA applies to DOE facilities, including those operated under the Atomic Energy Act. However, RCRA does not apply to source, special nuclear or byproduct materials as defined in the Atomic Energy Act. In addition, pursuant to section 1006 of RCRA, specific RCRA regulations may not apply to some aspects of DOE operations, on a case-by-case basis, where those regulations could be inconsistent with the requirements of the Atomic Energy Act.

As I mentioned earlier, Mr. Lee Thomas, who is EPA's Assistant Administrator for the Office of Solid Waste and Emergency Response, has initiated high level discussions on a memorandum of agreement with the Department of Energy in headquarters to cover hazardous waste management at all DOE facilities. Where we have problems with those gray areas, we expect to see those resolved.

I would like to point out that in my recent discussions with DOE as well as the commitments that have been obtained from Mr. La Grone and his staff here, that DOE has certainly indicated their intent to manage their wastes in a responsible manner in order to minimize environmental hazards, and we believe that with the Executive order and with those commitments, compliance can be achieved at Y-12 under the existing statutory authority.

The major things that need to be accomplished to achieve compliance is reissuance of the NPDES permit with construction of a new waste treatment facility; a ground water study needs to be completed and evaluated; we need to have closure of all of the sites I have identified previously under the applicable laws and regulations that apply to RCRA. We need to complete the action plans on the mercury task force that we have talked about.

I will summarize by saying that the environmental problems are serious; require immediate remedial measures to be put into effect. Based on the present level of information that we have concerning this site, we are not aware of an imminent threat to human health as a result of existing environmental contamination. A final decision cannot be made on this issue until the studies have been completed, particularly those studies outlined and associated with ground water contamination by mercury and other contaminants. We believe that the existing institutional mechanisms and the strategy of the MOU are adequate to accomplish our objectives.

It is very important to work closely with the State on all of these issues, and we have already indicated our intent to do so. When final decisions are made between EPA and the State relative to closure of sites, new issuance of permits and other actions that may be required, these matters will be set forth in a Federal Facilities Compliance Agreement with specific dates and milestones. The final decision for cleanup of sites will be based on the data provided when all of the studies are completed. Support by Congress and OMB for adequate funds to accomplish these objectives is mandatory if compliance is to be achieved.

Finally, EPA will require that a long-term multimedia monitoring program be established for all of the Oak Ridge operations in accordance with applicable requirements of RCRA and CERCLA.

This generally concludes my statement, and I will be happy to respond to any questions.

[The prepared statement of Mr. Zeller follows:]

STATEMENT OF
HOWARD D. ZELLER
ASSISTANT REGIONAL ADMINISTRATOR, REGION IV
ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT
THE
SUBCOMMITTEE ON ENE RESEARCH AND PRODUCTION
COMMITTEE ON SCIENCE AND TECHNOLOGY
U. S. HOUSE OF REPRESENTATIVES

OAK RIDGE, TENNESSEE

JULY 11, 1983

I am Howard D. Zeller, Assistant Regional Administrator, Environmental Protection Agency, Region IV, located in Atlanta, Georgia. At the request of the two Congressional Subcommittees listed above, I have come to Oak Ridge to present information on the environmental problems at the Y-12 facility operated by the Department of Energy (DOE) at Oak Ridge. This facility is one of several operating facilities under the responsibility of the DOE.

The environmental problems at Y-12 which are discussed in my statement are serious and require that immediate remedial measures be put into effect. However, based on the present level of information, we are not aware of an imminent threat to human health. A final decision cannot be made until additional studies have been completed at this site.

EPA's regulatory authorities for environmental quality control at Oak Ridge are found in the Clean Water Act (CWA), Clean Air Act (CAA), Safe Drinking Water Act (SDWA), the Resource Conservation and Recovery Act (RCRA), Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), Toxic Substance Control Act (TSCA), and Executive Order 12088, Federal Compliance with Pollution Control Standards. These authorities appear to be clear and adequate to achieve compliance at federal facilities. It is the position of the EPA that non-nuclear wastes at DOE facilities are subject to the same regulatory requirements under applicable environmental laws, both substantive and procedural, as any other regulated entity, unless these requirements are inconsistent with the requirements of the Atomic Energy Act (AEA).

Executive Order 12088 deals primarily with EPA's role in working with federal agencies who own or operate facilities. It requires EPA to work with federal agencies such as the DOE and Office of Management and Budget to assure that federal facilities comply with applicable environmental protection standards. The State of Tennessee Department of Health and Environment (TDHE) also has the legal authority to regulate federally owned and operated facilities located within the State. Several programs under the legislation listed above have been delegated to the State of Tennessee under the authority provided in those laws by Congress. Principal program areas delegated to the State of Tennessee are:

A. The National Pollution Discharge Elimination System (NPDES) program, under authority of the Clean Water Act, requires a permit to discharge wastewater into navigable waters. Authority to issue permits to municipal and industrial facilities (except for federal facilities) has been delegated to the TDHE.

EPA retains the authority for issuance of NPDES permits for federal facilities in Tennessee.

B. The following programs have been delegated to the TDHE under the Clean Air Act which provides for control of air pollution in Tennessee, including all federal facilities:

PSD - Prevention of Significant Air Deterioration
NSPS - New Source Performance Standards
NESHAPS - National Emissions Standards for Hazardous Air Pollutants
Section 110 - Basis for Control Program.

C. The Resource Conservation and Recovery Act (RCRA) regulates the generation, transportation, treatment, storage, and disposal of hazardous wastes. EPA has delegated to the State the authority for Phase I, which means that Tennessee has adopted programs substantially equivalent to EPA's for all RCRA responsibilities except for permitting.

D. The program under the Safe Drinking Water Act (SDWA) wherein the State has primacy over public water supplies, including federal facilities, has been delegated to the TDHE.

These programs for which the State has authority are subject to overview by EPA, and on significant facilities such as found at the Oak Ridge operations, EPA and the State will work very closely in the regulatory process. The State, under authority listed in Section 401 of the Clean Water Act for example, will be required to certify any wastewater discharge permit which may be issued to any DOE operation, and they will be requested by EPA to participate jointly in development of all environmental controls which are placed in effect at this site.

The State of Tennessee and EPA have already been heavily involved and working together on the Y-12 facility. While EPA was already aware of some of the environmental problems at Y-12, our attention was drawn to a February 23, 1983, compliance evaluation inspection made by the TDHE which listed a wide range of environmental problems. Following a discussion with TDHE on the potentially very serious environmental impacts, a joint meeting was held with EPA, DOE and the State of Tennessee in Atlanta on April 8, 1983, for detailed discussions of the areas of environmental concern and for developing a strategy for achieving compliance with applicable regulatory requirements at this site. During this meeting and subsequent meetings that were held on May 25 and 26, 1983, a Memorandum of Understanding (MOU) between the DOE, EPA, and the TDHE was developed to address compliance with pollution control standards at the Y-12 facility. A copy of this MOU is attached for the record. (See Attachment No. 1).

This MOU provides a blueprint and strategy for gathering necessary data which will aid in the development of remedial measures. It is anticipated that this will lead to reissuance of the National Pollutant Discharge Elimination System (NPDES) permit, closure of hazardous waste sites, and the possible issuance of hazardous waste facility permits.

Environmental Problems and Areas of Concern Associated with Past and Present Waste Disposal Methods

As a result of the recent state and federal investigations on site and information obtained from operational and environmental officials at the DOE, we have identified seven (7) problem areas of environmental concern at the Y-12 facility. These are as follows:

A. Wastewater discharge from Y-12 to East Fork Poplar Creek (Need for reissuance of NPDES permit to include all presently permitted as well as unpermitted discharges).

B. Pollutants discharged from New Hope Pond and disposal of sludge--past and future.

C. Discharges to S-3 ponds and potential contamination of ground and surface water from these ponds.

D. Improper disposal of PCB contaminated oils, and hazardous and potentially hazardous wastes in the "Isolation Area", "Disposal Pits", and "Oil Land Farm".

E. Contamination of East Fork Poplar Creek and Bear Creek from a massive mercury spill and unknown contamination of these waters by plutonium (Pu), mercury (Hg), lead (Pb), uranium (U), thorium (Th), beryllium (Be), and polychlorinated biphenyls (PCB's).

F. Unknown extent, degree and characterization of ground water contamination as a result of improper storage, disposal and management of hazardous wastes.

G. Radioactive discharges to the environment and extent of impact.

Compliance Measures Initiated and Proposed Solutions to Environmental Problems Identified Above

Wastewater Discharge from Y-12 to East Fork Poplar Creek: A revised NPDES permit must be issued. Additional information, however, must first be acquired that relates to the chemical waste characterization of the discharges and effluent descriptions of all discharges, including process description and flow quantification. Also required are interim treatment and control measures, including plans, specifications and schedules for accomplishing these objectives. The MOU required that the above information be submitted on or before May 31, 1983, for review and response by EPA and the State. The information was received on the date indicated. Additional requirements for development of the permit and the dates when these requirements are to be met are included in the seven separate steps outlined in the MOU. The necessary chemical studies and a permit application are to be submitted to the State and EPA on or before December 15, 1983. A treatment plant will be required and permits for other discharge points will require strict poundage limitations and maximum allowable effluent concentrations. The MOU will also provide for New Hope Pond to serve as a spill contingency basin in the event of any upsets or malfunction of the waste treatment basin. It is expected that the final dates required for construction of the treatment plant will be incorporated in a Federal Facilities Compliance Agreement executed by EPA and the DOE.

New Hope Pond (NHP): New Hope Pond has been, and is presently serving as, an onstream wastewater treatment device. It is a settling pond for solids being carried by East Fork Poplar Creek from the Y-12 facility. It has been agreed that NHP will be eliminated as an NPDES discharge point. A report was submitted to EPA and TDHE on July 1, 1983. This report covers:

a. Characterization of sediments in NHP
b. An assessment of active Hg sources
c. Plans and specifications for the NHP by-pass and its use for spill control
d. Plans and specifications for cleaning out NHP.

In addition, DOE will examine the NHP sludge disposal area that lies on top of Chestnut Ridge above NHP. This Area is a modified depression with no apparent surface discharge point. DOE will conduct and report leachability tests and evaluate the site's suitability. If the testing shows that the sludge placed in this area is hazardous, appropriate remedial actions under CERCLA and closure under RCRA will be required.

S-3 Pond Discharges and Potential Contamination of Ground and Surface Waters: The S-3 ponds consist of four (4) unlined, connected ponds of approximately one (1) acre each and they serve as holding and treatment devices for plating sludges, plating solutions, nitric acids, hydrochloric acids, stripping and cleaning solutions, mop water (containing U, Be, Th), halogenated solvents and other waste generated at the Y-12 facility. These ponds have no discharge outlets but are known to leak badly into the headwaters of Bear Creek causing severe pollution and damage to aquatic life. The proposed Central Pollution Control facility will replace the S-3 ponds. The MOU with DOE provides for the elimination of waste contributions to the S-3 ponds and requires that adequate wastewater treatment be put in place. DOE submitted a proposal on July 1, 1983, to cease all discharges to these ponds. DOE will submit, by September 15, 1983, a closeout proposal including plans, specifications, and time schedule for treatment of impounded waste and closeout of the ponds. Any remaining hazardous wastes will be subject to appropriate remedial action under CERCLA and proper closure under RCRA.

Improper Disposal of PCB Contaminated Oils: Waste oils and solvents were generally disposed of in earth trenches or by ground burial at this facility in the past. In 1968 it was noted that at the Y-12 oil ground burial disposal area, liquids were seeping out of the hillside below disposal trenches. Therefore, an oil pond was built to intercept the seepage from entering Bear Creek. Presently the pond is covered with oil containing high concentrations of PCB and solvents. If the material disposed of in this pond is a hazardous waste under RCRA it would be considered to be a RCRA hazardous waste surface impoundment.

It is our intention to deal with this problem through the reissued NPDES permit and as a possible Section 307(g) toxic pollutant under the Clean Water Act. PCB's and PCB contaminated materials and oils must be disposed of in accordance with PCB regulations under TSCA. The other waste materials which are hazardous wastes must be disposed of in accordance with the requirements of RCRA and CERCLA. The MOU requires DOE to characterize the wastewater discharge from the pond. When accomplished, the discharge point will be limited in the NPDES permit. We have also required that an inventory of all waste deposited in the pond be conducted. Upon receipt of this information, we will require whatever action is necessary under the CWA, TSCA, and/or RCRA to eliminate this pond as a pollution source.

Contamination of East Fork Poplar Creek and Bear Creek by Mercury and Other Contaminants: According to DOE, in the years 1955 to 1966, huge quantities of mercury were released to the local environment of the Y-12 facility, including New Hope Pond and the East Fork Poplar Creek. The losses total a DOE estimated 470,000 lbs to the creek and 30,000 lbs as airborne losses. We had no knowledge of mercury spills in this area until November of 1982. We had no information on quantities until May 1983 when DOE released portions of a classified document concerning the mercury inventory at Y-12. The magnitude of the release is very significant.

Recent sediment tests performed by DOE show that East Fork Poplar Creek is contaminated with significant quantities of mercury. This contamination is contained primarily in the fine sediments and can be carried downstream during storms of sufficient intensity to cause erosion of the stream bed or stream banks. A report dated September 7, 1982, prepared by Y-12 staff members and the Oak Ridge National Laboratory indicated sediment concentrations range from 19 ppm to 127 ppm, decreasing downstream.

New Hope Pond is in the upper reaches of the EFPC drainage area and receives runoff from the Y-12 facility. The September 7, 1982, report showed mercury concentration to be 292 ppm in the 80 to 85 cm layer of New Hope Pond, which is believed to be representative of the oldest sediment in the pond.

According to DOE, New Hope Pond was not constructed until about 1963. The DOE indicated that the processing of lithium, which used mercury, took place starting about 1954, and therefore some of the spilled mercury may have been entrapped in the stream sediments. All of New Hope Pond except a small portion of it was dredged in 1973 and the material was disposed of at the Chestnut Ridge site. Mercury presently in the pond has accumulated since this time. Since the mercury is associated with fine grained particulate matter, some of it may have washed out of the pond downstream during heavy rains.

Bear Creek, which also rises near the Y-12 facility, does not appear to have a significantly active source of mercury based on the limited data presently available. Fine grained sediments in the headwaters at the Y-12 facility are elevated by a factor of approximately 40 over natural background mercury concentrations which are stated to be about 0.3 ppm. Concentrations, however, decrease rapidly 0.8 km downstream to sligtly above background levels.

Limited DOE data on fish and moss in EFPC also showed a decreasing downstream tendency in mercury concentrations. However, since some fish in the upper reaches of EFPC were found to have concentrations above the allowable FDA value of 1.0 ppm, the stream has been posted and closed to fishing by the State of Tennessee.

The MOU addresses the mercury issue and calls for a task force to be organized (to include TDHE, EPA, TVA, and DOE) for the purpose of studying the contamination and to formulate a remedial action plan. This task force is now at work and will consider, in addition, other possible contamination parameters as well as ambient air sampling for mercury. The task force will make final recommendations for action regarding clean up and restoration of Bear Creek and EFPC when all studies have been completed.

Extent of chemical characterization and degree of ground water contamination as a result of improper storage or management of hazardous wastes: Through its operating contractor, DOE has awarded a contract to investigate the hydrologic characteristics of the Bear Creek Valley disposal areas (isolation area, disposal pits, oil pond and trenches and oil landfarm), the S-3 Ponds and the New Hope Pond sludge disposal basin. The purpose of the study is to evaluate the groundwater flow, monitoring data and the adequacy of the existing Y-12 groundwater monitoring program. It is expected that the results of this investigation will provide information to assess site conditions, determine if significant contamination to the groundwater has resulted from operations, and assess the need and feasibility of corrective measures. If EPA concludes that DOE's monitoring well network is inadequate to fulfill the requirements of RCRA, EPA will require additional wells.

As agreed in the MOU, EPA and TDHE will review the contractor's plan of study and the final groundwater study report which is to be submitted to EPA and TDHE on or before December 31, 1983. Through the MOU, DOE agreed that on or before July 31, 1983, it will submit to TDHE and EPA a master monitoring plan for groundwaters and surface waters of the entire Y-12 facility, indicating all present sampling locations and all parameters analyzed. EPA will determine and implement any necessary RCRA permitting or other regulatory requirements.

Radioactive Discharges to the Environment: Detailed radioactive airborne emission data at Y-12 are accumulated throughout the year for radionuclides. These data are then combined with meterological data to determine the maximum whole body and critical organ doses to an average individual living all year at the plant perimeter and an integrated population dose commitment within an 80 Km radius of the Oak Ridge site. The major gaseous waste emissions from the Y-12 plant are uranium 234 and 238.

Under the Clean Air Act, EPA has proposed radionuclide limits on airborne emissions from DOE facilities. The Oak Ridge Reservation, including the Y-12 plant, was among a group of 13 DOE facilities with higher emissions and was therefore studied in more detail. The proposed indirect emission standard proposed for all DOE facilities will restrict emissions from each site to the amount that would cause an annual radiation dose equivalent to 10 millirem to the whole body and 30 millirem to any organ of any member of the public. This emission standard is intended to keep the radiation dose low and to protect both nearby individuals and populations living around DOE sites.

At the Oak Ridge site, the calculated highest doses to nearby individuals are mostly caused by particulate emissions of uranium from the Y-12 plant. If the proposed new standard is promulgated, DOE must either demonstrate compliance or upgrade their emission control technology.

Liquid radioactive wastes are not released but are concentrated and contained in tanks for ultimate disposal. Process water which may contain small quantities of radioactive materials is discharged, after treatment, to White Oak Creek, Poplar Creek, East Fork Poplar Creek, and Bear Creek, which are small tributaries to the Clinch River.

Existing Regulatory Mechanisms and Authorities to Control Environmental Impacts from Y-12

EPA believes that RCRA applies to DOE facilities, including those operated under the Atomic Energy Act. However, RCRA does not apply to source, special nuclear or by-product materials as defined by the AEA. In addition, pursuant to Section 1006 of RCRA, specific RCRA regulations may not apply to some aspects of DOE operations, on a case-by-case basis, where those regulations could be inconsistent with the requirements of AEA. (See Attachment No. 2).

Lee Thomas, the EPA Assistant Administrator for the Office of Solid Waste and Emergency Response, has just initiated discussions on a Memorandum of Understanding with DOE covering hazardous waste management.

Recent discussions with DOE, as well as commitments contained in the Region IV-DOE MOU, reflect DOE's intention to manage their wastes in a responsible manner in order to minimize environmental hazards. Therefore, we believe that with the Executive Order 12088 and DOE commitments to date, compliance can be achieved at Y-12 under the existing statutory authority.

Based on the present agreements and schedules included in the MOU, we believe that the serious problems identified at this site can be resolved in a timely manner. We further believe that the participation of the TDHE is a key to the process of achieving compliance and we intend to continue close working relations at this site, as well as other sites at Oak Ridge, to assure that environmental objectives are met. The state certification process, as indicated previously, is a strong vehicle to accomplish these objectives. In accordance with the MOU and our discussion on need for environmental controls, we believe that when the following actions are completed, environmental standards will be achieved:

A. Reissuance of the NPDES permit providing for construction of a new waste treatment facility under provisions of the Clean Water Act.

B. A ground water study to address impacts that may have occurred as a result of improper storage and disposal of hazardous wastes. The present ground water study will provide a description of ground water movement, identify pathways for contamination and future ground water monitoring. Mitigative measures, and/or the need for permits if identified, will be incorporated in the Federal Facilities Compliance Agreement in accordance with applicable provisions of the SDWA, RCRA, and TSCA.

C. Closure of Disposal Sites--The DOE will provide (in accordance with the MOU) sufficient chemical analyses to determine whether sludges and waste waters are hazardous wastes as defined by EPA regulations. Those areas which are determined to contain regulated hazardous wastes and are to be closed, will be closed in accordance with applicable laws and regulations.

D. Mercury Clean Up--A task force including representatives of EPA, State of Tennessee, Tennessee Valley

Authority (TVA), and the DOE has been established and the first meeting held on June 23, 1983. The purpose of the task force is to study the contamination and formulate a remedial plan for potential clean up of identified pollutants in East Fork Poplar Creek and Bear Creek. A final decision on any proposed clean up cannot be made until additional field studies establish the extent, description and level of contamination in the environment.

Summary

The environmental problems that have been enumerated in this statement are serious and require immediate remedial measures to be put into effect. Based on the present level of information that we have concerning this site, however, we are not aware of an imminent threat to human health as a result of existing environmental contamination. A final decision cannot be made on this issue until the studies have been completed, particularly those studies outlined previously associated with ground water contamination and the contamination by mercury and other pollutants. We believe that the existing institutional mechanisms and the strategy of the MOU are adequate to accomplish our objectives.

It is very important to work closely with the State on all of these issues and we have already indicated our intent to do so. When final decisions are made between EPA and TDHE relative to closure of sites, issuance of permits, and other actions that may be required, these matters will be set forth in a Federal Facilities Compliance Agreement with specific dates and milestones. The final decision for clean up of sites will be based on the data provided when all of the studies are completed. Support by Congress and OMB for adequate funds to accomplish these objectives is mandatory if compliance is to be achieved.

Finally, EPA will require that a long-term multi-media monitoring program be established for all of the Oak Ridge Operations in accordance with applicable requirements of RCRA and CERCLA.

This concludes my statement. I will be happy to respond to any questions you may have.

ATTACHMENT 1

MEMORANDUM OF UNDERSTANDING BETWEEN THE U.S. DEPARTMENT OF ENERGY AND THE U.S. ENVIRONMENTAL PROTECTION AGENCY AND STATE OF TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT CONCERNING COMPLIANCE WITH POLLUTION CONTROL STANDARDS AT THE DEPARTMENT OF ENERGY Y-12 PLANT, ANDERSON AND ROANE COUNTIES, TENNESSEE

This Memorandum of Understanding (MOU) is intended to clarify the compliance objectives agreed upon by the parties during a meeting held in Atlanta on April 8, 1983. Analysis of information received from the Department of Energy (DOE) along with information gathered as a result of a February 23, 1983, Compliance Evaluation Inspection by the Tennessee Department of Health and Environment (TDHE) revealing serious environmental problems associated with past and present waste disposal practices at the Department of Energy (DOE) Y-12 facility, necessitate that expeditious and thorough investigative and remedial measures be taken. To this end, this MOU provides the actions agreed upon by the parties as constituting preliminary measures toward DOE achieving full compliance with all federal and state pollution control laws at its Y-12 facility. It is understood and agreed to by the parties that this MOU serves as a work plan for obtaining information, from which it is anticipated, further plans, actions and remedial programs will be developed. The plans, actions and remedial programs encompassed by this MOU shall be implemented in accordance with applicable regulatory requirements.

It is further understood and agreed that the compliance measures to be taken at Y-12 include but are in no way limited to those outlined herein. Furthermore, no party to this MOU in any way waives its rights to any other action or remedy available to it by law, nor is precluded from taking or requiring additional action with respect to environmental problems presently known to exist, or which may later be found to exist at this facility, nor shall the MOU constitute an admission of liability or a waiver of any defense.

To carry out the intent of this MOU the parties agree to take action with respect to each of the areas of the Y-12 facility, as those areas are further described in the March 8, 1983, TDHE Notice of Noncompliance with which all parties hereto are familiar.

I. Upper East Fork of Poplar Creek (EFPC) - also known as the "industrial ditch"

1. DOE agrees to submit to TDHE and to the Environmental Protection Agency (EPA), on or before May 31, 1983, a preliminary report containing the following information:

   a. A map showing all Y-12 discharges to upper EFPC;
   b. The effluent description of all Y-12 discharges to upper EFPC, including process description and flow quantification (process and cooling water); and
   c. Interim treatment/control measures - including treatment and/or elimination (provide plans and specifications as necessary as well as schedule for same).

2. DOE agrees to submit to EPA and TDHE an assessment of coal storage and steam plant management plans to include water quality impacts on or by July 29, 1983.

3. TDHE and EPA agree to review the preliminary report and meet on site to determine further needs and to submit comments to DOE on/or before July 1, 1983.

4. DOE agrees to submit a final report on/or before September 15, 1983, verifying the information described in I.a. and b. above and designating the discharge points to be eliminated. A progress meeting will be held on or before September 15, 1983, to discuss waste water characterizations.

5. DOE agrees to provide to EPA and TDHE a final detailed waste water characterization by November 15, 1983.

6. DOE agrees to submit plans and specifications for all proposed interim treatment or control measures on or before December 15, 1983.

7. DOE agrees to submit all permit applications for the remaining discharges to EFPC on/or before December 15, 1983.

II. Pollutants Discharged from New Hope Pond (NHP)

1. DOE agrees to immediately take steps as outlined below to eliminate NHP as an NPDES discharge point.

2. DOE agrees to submit a report to EPA and TDHE on/or before July 1, 1983, containing:

   a. characterization of sediments in NHP;
   b. assessment of active sources of mercury contamination;
   c. plans and specifications for the NHP by-pass and its use for spill prevention and control; and

d. plans and specifications for cleaning out NHP.

III. New Hope Sludge Disposal Area

1. DOE agrees to submit to EPA and TDHE on/or before July 29, 1983, results of leachability tests.

2. DOE agrees to submit a report, on/or before August 31, 1983, evaluating site suitability and management practices.

IV. S-3 Ponds

The defined objective of the MOU is to cease all waste contributions to the S-3 ponds, and to eliminate the S-3 ponds as sources of contamination to surface and groundwater.

1. Elimination of waste contributions to S-3 ponds

On or before July 1, 1983, DOE agrees to submit to EPA and TDHE a proposal to cease all discharge of waste to the S-3 ponds. The proposal will include source description, waste stream characterization including chemical and radiological parameters, and volume/frequency of discharge. This proposal will include a management strategy for treatment elimination and/or containment of all waste currently entering the S-3 ponds with an implementation schedule for each descriptive category. Where appropriate, waste contribution elimination proposals will be implemented in an expedient manner.

2. Close out of S-3 ponds.

   a. DOE agrees to perform a definitive characterization of the S-3 ponds to be completed on or before July 15, 1983.

   b. On or before September 1, 1983, DOE agrees to submit a closeout proposal to include plans and specifications and implementation schedule.

3. Upon elimination of the S-3 ponds as a source of contamination to surface waters, DOE agrees to submit a plan and schedule for rehabilitation of Upper Bear Creek.

4. DOE shall establish on/or before July 1, 1983, a monitoring point at the discharge from the S-3 Ponds and establish the parameters to be monitored.

V. Burial Ground Oil Pond

1. DOE agrees to submit to EPA and TDHE on/or before November 1, 1983, a report to characterize wastewaters discharged from the pond and submission of NPDES application for the discharge.

2. DOE agrees to submit to EPA and TDHE on/or before January 31, 1984, a report to include:

   a. An inventory of waste deposited in the pond watershed;

b. A sediment assessment and inventory of existing contamination together with biological information regarding this area.

3. Based on parties' review and discussion of the report described in subparagraph 2, above, DOE agrees to take further appropriate action, which may include a plan for elimination of the sources of pollution to the pond and ultimate cleanup and closure of the pond.

VI. Isolation Area

DOE agrees to submit to EPA and TDHE on/or before January 31, 1984, an inventory of waste deposited in this area.

VII. Disposal Pits

1. DOE agrees to submit to EPA and TDHE a schedule for closure (including plans for alternate disposal) on/or before November 1, 1983.

VIII. Oil Land Farm

1. DOE agrees that, on or before November 1, 1983, it will:

   a. Implement a plan for preventing material from reaching waters of the State and United States, including interim erosion control measures by July 15, 1983; and

   b. Submit a description of runoff from this site; and

c. Submit an evaluation of alternative actions at this site, including establishment of an NPDES discharge point or ultimate cleanup and closure.

2. DOE agrees that, in the event it selects the alternative of establishing an NPDES discharge point under I.c., above, it will submit, on or before December 31, 1983, an NPDES permit application for this site.

3. DOE agrees to submit to EPA and TDHE, on or before January 31, 1984, a report that will include an inventory of material deposited in this area and an inventory of existing contamination.

IX. Contamination of East Fork Poplar Creek and Bear Creek

1. EPA, DOE and TDHE agree to establish and organize a Task Force to include representatives of TDHE, (with the Division of Water Management, TDHE, as lead), TVA, EPA, and DOE for the purpose of studying contamination and formulating a remedial plan if it is determined by EPA, DOE and TDHE that one is necessary. The roles and responsibilities of the task force members will be determined and agreed upon by the parties on/or before July 1, 1983.

2. The contamination study will include but not be limited to the following items:

   a. Definitive sediment and fishery study for Bear Creek and EFPC;
   b. Assessment and inventory of flood plain contamination;
   c. Multiparameter Pu, Hg, Pb, U, Th, Be, PCB Sediment Transport Study;

d. Ambient air sampling for Hg;

e. Assessment and management plan regarding urban development disturbance areas adjacent to EFPC and Bear Creek including:

   i. Distribution of dredge material for home landscaping, fill material and gardening.

   ii. List of commercial developers, including Corps §404 permittees; and

f. Public notification.

X. Groundwater Study for Y-12 Facility

1. On or before May 31, 1983, DOE, through its operating contractor, will award a contract to investigate the hydrologic characteristics of the Bear Creek Valley disposal areas (isolation area, disposal pits, oil pond and trenches and oil landfarm), the S-3 Ponds and the New Hope Pond sludge disposal basin. The purpose of the study is to evaluate the groundwater flow, monitoring data and the adequacy of the existing Y-12 groundwater monitoring program. It is expected that the results of this investigation will provide information to assess site conditions, determine if significant contamination to the groundwater has resulted from operations and assess the need and feasibility of corrective measures. If the contractor evaluates DOE's monitoring well network as being inadequate to fulfill the requirements of 40 CFR 264, 265 and 122.25, the contractor will recommend locations for additional wells and provide sketches and criteria for installation of the wells.

2. On or before June 30, 1983, DOE will submit to TDHE and EPA the contractor's plan of study.

3. EPA and TDHE will submit comments on the plan of study by July 15, 1983.

4. On or before December 31, 1983, DOE shall submit to TDHE and EPA the final groundwater study report.

XI. Master Monitoring Plan for Y-12

DOE agrees that, on or before July 31, 1983, it will submit to TDHE and EPA a master monitoring plan for groundwaters and surface waters of the entire Y-12 facility, indicating all present sampling locations and all parameters analyzed.

In the process of characterizing existing wastewaters, wastewater discharges, sediment and sludges of the areas mentioned, DOE will include sufficient analyses to determine whether or not such wastewaters discharged to, or sludges and wastewaters contained in, the areas are hazardous wastes as defined in EPA regulations at 40 C.F.R. Part 261. For those areas which are determined to contain hazardous wastes and which are to be closed, the plan for closure will incorporate the technical requirements for closure contained in Subparts G, K, L, M and N of 40 C.F.R. 264 and 40 C.F.R. 265, as appropriate.

The parties agree that all information required to be submitted by this MOU, and any other correspondence with respect to this MOU, is required to be given in writing, and mailed to each party as follows:

Mr. Howard D. Zeller
Assistant Regional Administrator
for Policy and Management
U.S. Environmental Protection Agency
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Dr. Michael T. Bruner
Assistant Commissioner
Tennessee Department of Health and Environment
T.E.R.R.A. Building
2nd Floor
150 Ninth Avenue, North
Nashville, Tennessee 37203

Mr. Joe La Grone
Manager, Oak Ridge Operations
U.S. Department of Energy
P.O. Box E
Oak Ridge, Tennessee 37830

Howard Zeller
U.S. Environmental Protection Agency

May 26, 1983
Date

Joe La Grone
U.S. Department of Energy

May 26, 1983
Date

Michael T. Bruner
Tennessee Department of Health and Environment

May 26, 1983
Date

ADM/kav D/3

ATTACHMENT 2

RCRA COMPLIANCE STATUS
OAK RIDGE FACILITIES
JUNE 1983

In order to explain the current status of DOE's compliance with EPA hazardous waste regulations, it is necessary to describe briefly the procedural requirements that went into effect in 1980 for all hazardous waste handlers and facilities. To begin with, all generators and transporters of hazardous wastes and those facilities that treat, store or dispose of hazardous wastes were required to notify EPA of their activities and obtain an EPA Identification Number.

The deadline for notifying EPA was August 18, 1980. In addition to the notification requirement, those facilities that treat, store or dispose of hazardous wastes were further required to submit the Part A of a RCRA permit application as the first step toward obtaining a full RCRA permit. (Note that generators and transporters which do not otherwise treat, store, or dispose of hazardous waste are not required to obtain a RCRA permit.) The deadline for existing facilities to submit Part A applications was November 19, 1980.

The DOE submitted to EPA the following notification forms on hazardous waste activity at its Oak Ridge operations in Tennessee:

FACILITY NAME	TYPE ACTIVITY	EPA ID NO.
U.S. DOE Oak Ridge Assoc. Univ. Laboratory Road Oak Ridge, TN	generator and transporter	TN9 890 090 005
U.S. DOE, K-25 Site Oak Ridge Turnpike at Blair Road Oak Ridge, TN 37830	generator and transporter	TN0 890 090 004
U.S. DOE Oak Ridge National Lab Bethel Valley Road Oak Ridge, TN 37830	generator, treatment, storage, or disposal facility	TN1 890 090 003
U.S. DOE-Rust Engineering Bear Creek Road Oak Ridge, TN 37830	transporter	TN9 890 008 981
U.S. DOE Comparative Animal Resch Lab 1299 Bethel Valley Road Oak Ridge, TN 37830	generator and transporter	TN2 890 090 002
U.S. DOE Y-12 Plant Bear Creek Road Oak Ridge, TN 37830	generator, transporter, treatment, storage, or disposal facility	TN3 890 090 001

The DOE submitted to EPA the following Part A applications for different activities at its Oak Ridge operations:

FACILITY NAME	TYPE ACTIVITY	EPA ID NO.
U.S. DOE Oak Ridge National Lab Bethel Valley Road Oak Ridge, TN 37830	Storage in containers Storage in tanks Treatment	TN1 890 090 003
U.S. DOE Y-12 Plant Bear Creek Road Oak Ridge, TN 37830	Treatment of certain potentially explosive or water reactive chemicals. (This Part A was not submitted until March 1981, therefore, did not qualify for interim status.)	TN3 890 090 001
U.S. DOE Comparative Animal Research Lab 1299 Bethel Valley Road Oak Ridge, TN 37830	Storage in containers Storage in tanks Carbon treatment of waste streams (This Part A was withdrawn by letter dated September 23, 1981.)	TN2 890 090 002

By submitting notification forms and Part A applications for those activities noted and by complying with EPA interim status standards, an existing facility is in compliance with EPA hazardous waste regulations until it is issued or denied a full RCRA permit.

BIOGRAPHICAL SKETCH

HOWARD D. ZELLER
ASSISTANT REGIONAL ADMINISTRATOR
FOR POLICY AND MANAGEMENT
ENVIRONMENTAL PROTECTION AGENCY
REGION IV

Present Position:	Assistant Regional Administrator for Policy and Management
Education:	Bachelor of Science, Biology and Chemistry Master of Science, Field Zoology
Experience:	Twenty-nine (29) years with management of environmental programs, thirteen (13) years with the State of Georgia, and the past sixteen (16) years with the Environmental Protection Agency and predecessor agencies.
Positions Held:	State of Georgia, Game and Fish Commission, 1954 - 1967 Field Biologist, Fisheries Research Coordinator, Chief Fisheries Division and Assistant Director.
	EPA and Predecessor Agency 1967 to Present Water Quality Standards Coordinator, Chief Permits Branch, Deputy Director, Enforcement Division, Acting Director, Enforcement Division, and Assistant Regional Administrator for Policy and Management
Specific Assignments and Accomplishments:	Thirteen (13) technical publications, including "Investigations of Mercury Pollution in the Aquatic Environment of the Southeastern United States".
	Served on various committees and boards. Seven (7) years Water Quality Council, State of Georgia, Pesticides Review Board.
	Appointed in 1970 by Administrator Ruckelshaus to EPA National Task Force on "Mercury and Heavy Metals in the Environment".
	Served on other various subcommittees such as Thermal Pollution, Water Quality Criteria for Fish and Aquatic Life, Criteria for Mixing Zones and Special River Basin Studies.
	Chairman, Review Panel, for the Olin Consent Decree for the cleanup of DDT.

Mrs. **Lloyd**. Thank you very much, Mr. Zeller.

In your opening statement, you say "Based on present levels of information, we are not aware of an imminent threat to human health." Then you went on to list the ponds that you felt should be closed to accomplish the goals that we are striving toward. How are you going to close these areas before we have a central pollution control facility which is going to be some 3 to 4 years in the offing?

Mr. **Zeller**. At the present time, as I indicated in my statement, we said no more wastes are to be disposed of at these sites. We will take the wastes that have been previously disposed of there and treat them elsewhere. DOE will then stop using the ponds.

We also will need to initiate chemical characterization studies to find out what kind of material is in these ponds to know how to properly treat that material chemically to make it inactive and unobtrusive and probably dispose of the waste at some hazardous waste disposal site.

Mrs. **Lloyd**. In another disposal site.

Mr. **Zeller**. Yes. We would close out these ponds——

Mrs. **Lloyd**. Close out the ponds immediately, in the near future?

Mr. **Zeller** [continuing]. In the near future; yes. As soon as we can develop the data that we need to close out those ponds, we will close them out.

Mrs. **Lloyd**. A followup question in that regard, what is your position on the DOE proposal to alleviate the S-3 pond problem by adding chemicals to dissipate materials and settle out? Do you agree with DOE's proposal?

Mr. **Zeller**. I do not think we have made a decision on that at this time. Based on the information I have seen, this looks very favorable, but I think we need time to properly evaluate this proposal and we need time and data to make the proper decision. That is one of the things that we are——

Mrs. **Lloyd**. At the present time you have no negative feelings toward that proposal?

Mr. **Zeller**. No; I have no negative feelings, nor do I feel at this time that EPA is in a position to concur with the proposal.

Mrs. **Lloyd**. What is your view of really the health and safety problems that are associated with the mercury contamination here in Oak Ridge? Do you feel that you are going to need more data or do you think we have enough—you say, you know, we are going to collect more data, but do you think we have enough at the present time to recommend remedial actions? And what remedial actions are you leaning toward at the present time?

Mr. **Zeller**. I think we need more data. The existing information we have relative to levels of mercury in fish do not indicate a health hazard in that regard, based on information that we have. I am quite comfortable in feeling that we do not have a health hazard since the health hazard that we have all heard expressed is consumption of contaminated fish. I feel quite comfortable that the data we have indicates that the fish are not contaminated at this time.

However, that does not complete the picture. We have a continuing contamination problem; we have levels in fish higher than they should be and we have a lot of mercury in the East Fork Poplar

Creek, Poplar Creek and Clinch River and the Tennessee River. I would like to know where it is, in what amounts and what depths in the sediment it may be, and if there are concentrations of mercury in certain areas that may require cleanup. I just feel like we need a lot more information on the—on a mass balance, to determine the ultimate fate of the mercury that was spilled, and where it is in the environment.

Mrs. **Lloyd**. How long do you think this will take, Mr. Zeller, to get adequate information?

Mr. **Zeller**. We are in the process of trying to scope out some technical action plans now. A problem of this magnitude will probably take 2 to 3 years of field sampling and laboratory analysis before it is ultimately accomplished.

Mrs. **Lloyd**. Before you have conclusive data?

Mr. **Zeller**. Yes.

Mrs. **Lloyd**. In their statement that we will be hearing this afternoon, the Legal Environmental Assistance Foundation has charged that DOE was required to report the mercury releases to EPA in 1981 under the Superfund notification requirements.

Do you feel that DOE was required to report these releases? It is my understanding that a Federal agency does not receive Superfund allocations; they are not eligible for Superfund allocations; is that correct?

Mr. **Zeller**. That is correct, Superfund—that is, the dollars in Superfund for clean up are not available to Federal facilities. I would have to defer to counsel——

Mrs. **Lloyd**. Counsel, would you care to comment?

Mr. **Sargent**. More specifically, your question is?

Mrs. **Lloyd**. DOE was required to report mercury releases to EPA in 1981 under Superfund notification requirements. My question is, is this factual in your estimation, did DOE have to do this in 1981?

Mr. **Sargent**. I will be honest with you, I have not considered that question. I would have to give it a little bit of thought.

Ms. **Lloyd**. Will you supply the answer for the record?

Mr. **Sargent**. The answer is probably yes, but I would want to——

Mr. **Zeller**. We will provide an answer to that question.

[The information follows:]

Under Section 103(c) of CERCLA, DOE was required to notify the administrator of EPA of "any known, suspected, or likely releases" of hazardous substances from the various facilities at Y-12. The mercury spills that occurred in the time period of 1955 to 1968 would, in our opinion, fall within that requirement.

Mrs. **Lloyd**. I do want to ask you these questions while you are here, Mr. Zeller. The Legal Environmental Assistance Foundation charges that mercury limits should have been included in the Clean Water Act discharge permits for the Y-12 facility even though EPA region IV knew about the mercury releases and did not include them in their permit for discharge. What is your position relative to the inclusion of the mercury releases in the discharge permit?

Mr. **Zeller**. When the permit is reissued, I believe that we should include mercury limits in that permit and it will be included in a new permit when it is issued.

Mrs. **Lloyd**. But you feel that they were within their bounds of legality by not including them in the discharge permit previously?

Mr. **Zeller**. Well what can I say, I think it is a valid question to ask. Most of the mercury contamination that we are receiving is not point source.

Mrs. **Lloyd**. We are looking for what went wrong so we will not make the same mistake in the future.

Mr. **Zeller**. Yes, ma'am. Probably most of the mercury was from runoff and not point source, or if it was point source, it is residual mercury. There is very little mercury being utilized, to my knowledge, at the present time in Y-12. Most of the mercury that we are encountering is, I believe, residual mercury from years past.

Mrs. **Lloyd**. It is not methyl mercury?

Mr. **Zeller**. No; it is probably elemental mercury.

Mrs. **Lloyd**. Elemental mercury. Thank you very much, Mr. Zeller.

Mr. Gore?

Mr. **Gore**. Thank you very much.

Let me underscore one thing that my colleague underscored, and we will have further testimony on this from the panel of experts on mercury. But it is your view at EPA that based on current knowledge, there is no present threat to human health as far as the citizens of Oak Ridge are concerned; is that correct?

Mr. **Zeller**. Yes; that is correct.

Mr. **Gore**. I think that is important to underscore. There are serious problems that have to be solved here, we are going to get to the bottom of it, we are going to make certain they do not recur, we are going to fix the institutional arrangements that led to a failure to deal with it properly the first time, but in so doing, I think we need to make that point very clearly.

Again, we will revisit this with the experts and get into the reasons exactly why they are pretty well unanimous in the conclusion that there is no present threat to human health to the citizens of Oak Ridge.

Now let me get into some of these institutional problems here. The NPDES permits for Oak Ridge expired back in 1980. Why has it taken so long to get around to negotiating new permits, Mr. Zeller?

Mr. **Zeller**. We had difficulty in obtaining the necessary information for reissuance of the permit; as I indicated, the number of discharges and the problems with those discharges.

Mr. **Gore**. From DOE?

Mr. **Zeller**. Yes.

Mr. **Gore**. They did not provide you with the information you needed?

Mr. **Zeller**. No; they did not.

Mr. **Gore**. All right.

Mr. **Zeller**. And we also had some other problems too, Congressman, we had some problems relative to the jurisdictional issue at the facility, as to what constituted waters of the United States. There were a number of problems that we had relative to reissuance of this permit.

Mr. **Gore**. Well now, why did the negotiations break off completely in November 1980, regarding the new Oak Ridge NPDES permit?

Mr. **Zeller**. I do not think I can answer that. I have—let me refer that question to Mr. Linton, who is here and perhaps can respond to that. I am not sure that I can respond correctly.

Mr. **Linton**. They have not broken off.

Mr. **Gore**. They did break off in November 1980, did they not?

Mr. **Linton**. I take issue with that, we are still trying to negotiate information to put together an NPDES permit. We have had people on site discussing the NPDES issuance in 1981 and in 1982.

Mr. **Gore**. Well, what happened in November 1980, that can be characterized as a breakoff of the neogtiations?

Mr. **Linton**. If I remember correct, we came to Oak Ridge to gather more information to understand a little bit more what was going on inside the facility and discuss this issue about waters of the United States, to discuss moving the NPDES monitoring point which is a boundary limit type permit at New Hope Pond back up into the facility, and what information we needed to do that. It took a while to get that information and DOE stated they needed more time to provide that. It was about a year's time to gather the additional information.

Mr. **Gore**. Well, it is 3 years later now, and we still do not have the information.

Mr. **Linton**. We have got the information.

Mr. **Zeller**. Let me——

Mr. **Gore**. Well, we still do not have an NPDES.

Mr. **Linton**. That is right.

Mr. **Zeller**. Let me comment for the record, Congressman Gore, and say perhaps EPA did not pursue this issue of the permit as diligently as we should have, and——

Mr. **Gore**. You did not?

Mr. **Zeller**. Perhaps EPA did not pursue that issue as diligently as we should have. We had problems relative to getting the information, but perhaps we did not pursue that as diligently as we should have.

Mr. **Gore**. Problems on both sides.

Mr. **Zeller**. Yes. Perhaps we did not pursue that as aggressively as we should.

Mr. **Gore**. Well, in that regard, let me read to you from a memorandum to the file, dated April 26 of this year—DOE files, not your files—and without objection, I will put this into the record.

Mrs. **Lloyd**. Without objection, it will be made part of the record.

[The information follows:]

Department of Energy
Oak Ridge Operations
P.O. Box E
Oak Ridge, Tennessee 37830

April 26, 1983

To the Files

REPORT ON MEETING WITH U.S. EPA AND TENNESSEE STATE HEALTH DEPARTMENT REPRESENTATIVES, APRIL 8, 1983

Following is a report of a meeting which was held in Atlanta on April 8, 1983, between representatives of the U.S. EPA Region IV, representatives of the Tennessee Department of Health and the Environment (TDHE), and representatives from Oak Ridge Operations.

The purpose of the meeting was to discuss the State's March 8, 1983, Notice of Noncompliance and DOE's response to the Notice's findings. Also discussed was the status of East Fork Poplar Creek (EFPC). The meeting attendees are listed on Attachment I.

The meeting took about two hours. The broad principles of EPA/TDHE positions and DOE proposals in response to those positions were discussed. The EPA/TDHE positions are most completely summarized in Attachment II, "Compliance Objectives, Y-12 Federal Facility," prepared by the TDHE. The DOE response in relation to the findings of the Notice are contained in the letter of April 15, 1983, J. F. Wing to A. D. McKinney of the State of Tennessee, Attachment III. The amount of time alloted for the meeting did not allow for discussion of the issues, or planned DOE activities, in great technical detail.

EPA indicated that it and the TDHE were intending to memorialize the meeting in a document. This document was expected to be received at ORO during the week of April 18.

DETAILED NOTES

1. Upper Reaches EFPC (Industrial Ditch)

   EPA/TDHE want a characterization, including flow, for each "pipe" emptying into the ditch. An updated permit application would be expected as soon after characterization as possible, since EPA believes it is "vulnerable" on the permit front. EPA/TDHE expressed the belief that DOE should be making plans to eliminate outfalls and plan to install interim control measures. The state indicated that for any new control methods or equipment, they would want to review treatability studies and engineering designs as provided by their regulations. Mr. Linton of the EPA indicated that he would want to have the DOE monitor and report PCB, mercury, uranium, and thorium emissions on the new NPDES permit. DOE responded that such considerations could be discussed during permit re-negotiation along with the topics of compliance schedules and whether there was a need to resubmit the permit request.

2. New Hope Pond

   EPA/TDHE want New Hope Pond eliminated as a point source, with treatment occurring at the true source, prior to entering New Hope Pond. Henceforth, dilution will not be an acceptable method of achieving compliance with standards.

   The deposition of sediments containing PCBs or mercury in the pond may involve Resource Conservation and Recovery Act (RCRA) considerations according to James Holdaway of EPA. Throughout the meeting, the implications of RCRA's Atomic Energy Act activities exemptions was not explored. Mr. Holdaway also noted that groundwater monitoring around the pond may be required by the RCRA.

   Mr. Cothron, TDHE, indicated that the TDHE would want to study possible effluent impacts before the DOE utilized its bypass.

3. New Hope Pond Sludge Basin

   This basin may involve RCRA considerations. The State expressed concerns as to the potential for groundwater contamination.

4. S-3 Ponds

   These may involve RCRA considerations, particularly a closure plan. Mr. Linton suggested that a compliance schedule be generated to require the installation of the CPCF, to help insure its funding. The "rehabilitation" of Bear Creek was seen as a separate issue, for future study. TDHE wants interim treatment measures for our "laundry list of wastes," and wants the monitoring point moved closer with new parameters.

5. Burial Ground Oil Pond

   Mr. Zeller, EPA, indicated that the pond and surrounding area may "require significant further action," after further study. Mr. Cothron expressed a concern for biomagnification of PCBs in wildlife, and TDHE wants it eliminated as a source point. Mr. Linton indicated that some remedial actions may have to be taken under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, the "Superfund Act"). Mr. Linton stated that CERCLA provides for the EPA, in essence, to require a Federal facility to undergo remedial action. However, Mr. Linton cautioned that the Act does not allow the EPA or the respective Federal facility to draw upon the superfund itself for either studies or remedial action.

   It was at this time that Mr. Finger of EPA's Athens office expressed the belief that DOE should produce a "Master Monitoring Plan". This document would review all existing and planned environmental monitoring activities in and around the Y-12 Plant for all environmental media, including biota. Such a plan would be utilized by EPA/TDHE to determine if more monitoring is needed.

6. Isolation Area

Similar issues exist as with the burial ground oil pond.

7. Disposal Pits

Mr. Zeller indicated that a closure plan modeled along the requirements of the RCRA would be appropriate. The possible need for CERCLA remedial action pending further study was stated. EPA/TDHE indicated that they believed any new disposal location would require a permit.

8. Oil Landfarm

Similar issues exist as with the burial ground oil pond. Mr. McKinney, TDHE, stated that appropriate measures may include erosion control on the furrows and an oil absorbent boom on the discharge.

9. EFPC

Mr. Zeller stated that he had never seen such high mercury concentrations in sediment. He said he believed that much of what is known about the creek was dated and should be made current. Messrs. Linton and Zeller both expressed the belief that analytical methods of ORNL may be so sophisticated that DOE is causing itself unnecessary problems. The issue of the possible need for remedial action under CERCLA, after further study, was expressed. The TDHE indicated that other materials besides mercury were of concern, PCBs, uranium, thorium, and plutonium. It declared, also, that all future analyses of any environmental sample should include these substances as well as possibly lead and "anything else you may have emitted."

DOE indicated that fifteen to twenty-five years ago large amounts of mercury were utilized in a process that is no longer in operation. It is known that mercury, in small quantities, enters and leaves New Hope Pond. About $150K will be spent this year to clean up known sources of mercury from within the Plant, particularly old drain lines. DOE declared that it did not believe that existing levels of mercury in EFPC posed a problem. With the state's posting of EFPC against fishing, any concern about fish consumption became moot. Dredging of EFPC could do more harm than good through the removal of biota from the creek and the resuspension of sediments.

Mr. Zeller said that work on the shoulder areas of the creek might be more important than dredging the creek, given the fact that in some places older sediments had been placed on the floodplain. Mr. Cothron declared that it was not yet time to decide on remedial action.
Mr. Zeller said that whatever is done should be cost effective.
Mr. McKinney spoke of the possibility of forming a task force of his agency, DOE, TVA, and the Corps of Engineers to study EFPC, Poplar Creek and possibly the Clinch River, with respect to past sediment deposition and current effects. Such a study, would be comprehensive in nature, considering streambeds, floodplains, and biota. Mr. McKinney said he believed the other Federal agencies would contribute dollars and talent to the task force. It was left to Mr. McKinney, by Mr. Zeller, to organize the task force.

Mr. Sulkin of TDHE indicated that he was aware that the City of Oak Ridge had dredged EFPC at least once, and had stockpiled the removed material. He suggested that he had information indicating that this material was probably removed by residents for fill, landscaping, and gardens. DOE's position on the matter was requested. DOE replied that it was without sufficient facts or knowledge to state an opinion, and suggested that information should be requested from the City of Oak Ridge. The TDHE indicated that they would call a meeting with DOE and the City to discuss possible ramifications of this scenario.

10. Excessed Equipment and Materials

Mr. Sulkin produced Attachment IV, a package of notes and an offer for sale dealing with mercury contaminated sludges once under the control of the Y-12 Plant. The TDHE requested general assistance in determining who obtained custody of the materials from the Y-12 Plant.

11. United Nuclear Corporation Disposal Site
Classified Burial Ground

The TDHE expressed concern over the presence of thorium in a monitoring well around the classified burial ground and requested groundwater monitoring data from around the UNC disposal site.

One of the most important things to come out of the meeting was the principle that, henceforth, EPA and the State of Tennessee "will speak with one voice" on OR environmental matters. We can no longer expect EPA to buffer us from the State.

This memo has been compiled from the notes of Vincent J. D'Amico, James L. Foutch, Gabe J. Marciante, Mike A. Travaglini, and J. Chris Bird.

Gabriel J. Marciante
Environmental Protection Branch
Safety and Environmental Control Division

SE-331:GJM

Attachments:
As stated

cc w/attach:
G. G. Fee, Y-12
R. G. Jordan, 9704-2, Y-12
T. R. Butz, 9704-2, Y-12
D. E. Patterson, EP-32, GTN
J. W. Range, M-4
H. D. Hickman, DP-80
J. L. Foutch, CC-10
V. J. D'Amico, SE-30
W. H. Travis, SE-33
S. S. Stief, SE-331
M. A. Travaglini, SE-331
J. C. Bird, SE-331

Mr. Gore. This was prepared by Gabriel Marciante with the Environmental Protection Branch, Safety and Environmental Control Division at DOE, and he makes this statement—this is a report on meeting with US EPA and Tennessee State Health Department representatives on April 8. You are familiar with that meeting?

Mr. Zeller. Yes.

Mr. Gore. The memorandum to the file says, "We can no longer expect EPA to buffer us from the State." Do you feel that you played that role in the past?

Mr. Zeller. I certainly do not.

Mr. Gore. Well, I ask that question as a followup to your statement that perhaps you were not as diligent as you should have been in pursuing this matter.

Mr. Zeller. I make that statement, Congressman, based on the fact that we have a great many environmental problems that we deal with on a day-to-day basis. These problems tend to surface from time to time and receive action. This is not to say we are a crisis oriented agency, but problems develop and when we had additional information at Y-12 relative to this permit, as far as I am concerned, this surfaced as a very important problem, and I immediately initiated action to be taken in that regard.

Now perhaps we were not as aggressive as we could have been in the past, but I very strongly object to the statement that there was any buffering.

Mr. Gore. Well, again, that is not my statement, that is a statement by the Environmental Branch at DOE.

Mr. Zeller. I still object to it.

Mr. Gore. OK. Do you have reason to believe that that was the attitude taken by the Environmental Assessment Branch?

Mr. Zeller. No, sir; I do not. I think—no, I do not.

Mr. Gore. OK. Now why did EPA not require that mercury be a parameter of the original NPDES permit? Let me clarify for the record, NPDES is the national pollution discharge system under the Clean Water Act; correct?

Mr. Zeller. That is correct.

Mr. Gore. And people who have discharges are required to get permits of this kind so you can monitor the levels. Why was mercury not a parameter of the original NPDES permit?

Mr. Zeller. It probably was not included in the original permit because it is not a process discharge. In other words, the NPDES permit deals with point source discharges from a facility, and it is not relative to nonpoint source discharges, if you understand that distinction.

Mr. Gore. Well, maybe—try to put it in plain language for me so I can understand it. There was a process going on at Y-12 and there was mercury being discharged.

Mr. Zeller. But at the present time, I do not believe——

Mr. Gore. Oh, I see, this was a——

Mr. Zeller [continuing]. There are processes going on that contain mercury.

Mr. Gore. The process that was involved with the mercury spill was no longer underway there at the time the first permit was—OK, that clears that up.

Mr. Zeller. That is correct.

Mr. **Gore**. I appreciate that.

Now, what is going to happen under the Memorandum of Understanding when EPA and the Department of Energy disagree over what constitutes appropriate cleanup measures? If there are impasses, how will they be resolved under the Memorandum of Understanding?

Mr. **Zeller**. The Executive order allows for a procedure whereby these matters are referred to headquarters units in Washington and EPA and DOE at the highest levels in Washington would be brought to bear on this particular issue, as well as OMB at some later date, if that would be necessary.

Mr. **Gore**. As well as OMB?

Mr. **Zeller**. Yes. These are the general procedures that are provided for under the Executive order.

Mr. **Gore**. Well, now, I guess I am concerned that the MOU, the Memorandum of Understanding, as written, could lead to a number of disputes. Specifically if there is disagreement and you have to take it up to the head of EPA and the head of DOE to resolve it, that seems to be a cumbersome process. Does it to you?

Mr. **Zeller**. It—perhaps it may seem that way. Based on my experience, Congressman Gore, it is a process that has worked. We have been generally successful in achieving compliance utilizing this procedure under the Executive order.

Mr. **Gore**. OK. Now to clarify matters here, if you had a facility, if you had disposal sites such as those at the Y-12 facility, the S-3 ponds and the others, operated by a private facility instead of by the Government, what would your reaction be?

Mr. **Zeller**. You mean what action would we have taken in EPA?

Mr. **Gore**. Right.

Mr. **Zeller**. That is difficult to say on a case-by-case basis. We might have developed a consent agreement with that facility, we might have developed an enforcement order, or other actions could have been put in place that would be appropriate for these type circumstances.

Mr. **Gore**. Well, that would not be acceptable, they would be in violation of the law; is that correct?

Mr. **Zeller**. With a Federal facility, they would be, yes.

Mr. **Gore**. Yes. Now it appears that EPA has been following a less than forceful policy toward compliance and enforcement at Federal facilities. Is that a fair interpretation?

Mr. **Zeller**. I am not sure, perhaps it is. I would like to make this comment relative to that issue. As I am sure you know, Congressman, in matters of litigation the Department of Justice serves the Environmental Protection Agency in any issue that may come up relative to enforcement action that we take. And in the case of Federal facilities, the Department of Justice has made a determination on a case-by-case basis that they will not necessarily pursue litigation. In terms of compliance at Federal facilities, if there has been a backdown on compliance, I am not sure the record will support that statement.

Mr. **Gore**. Well, you know, I think that is open to some disagreement, and we are going to pursue that.

I just have a couple more very quick questions. You mentioned the S-3 ponds and that no more waste is going to go into the S-3 ponds. Is that what you said?

Mr. **Zeller**. Yes.

Mr. **Gore**. Well, dumping is still occurring at the S-3 ponds.

Mr. **Zeller**. It is at the present time—I indicated that we had received a proposal from the Department of Energy to utilize another waste treatment plant at Oak Ridge for that waste. We are reviewing that proposal, and that treatment facility; we have people up there this week and we will be able to respond back to DOE whether we think that is a proper approach.

Mr. **Gore**. When do you anticipate a decision on that?

Mr. **Zeller**. I think the ultimate decision on the feasibility of this can be made within a week or 10 days.

Mr. **Gore**. A week or 10 days?

Mr. **Zeller**. I do not think we have even had an opportunity to discuss this with the State at the present time.

This would require, Congressman, under existing regulations, a modification of the other permits and it would take time under these procedures to accomplish that.

Mr. **Gore**. How long do you anticipate that the dumping at the S-3 ponds will continue?

Mr. **Zeller**. By the time we would complete all of the necessary studies and evaluations and track our regulations, which would require public notice of a modified permit, it would probably be 3 or 4 months.

Mr. **Gore**. If this were a private facility dumping waste into a facility like the S-3 ponds, would you stop it immediately?

Mr. **Zeller**. We would follow the same procedure with a private facility.

Mr. **Gore**. You would allow them to continue——

Mr. **Zeller**. I think the record would always support that the Environmental Protection Agency has an expeditious but reasonable record of achieving compliance. In this case, this would simply—could perhaps mean shutting down this facility, and I think the record would show that we have not shut down facilities; we have asked for immediate compliance and expeditious and reasonable schedules to get things done.

This is a very tight schedule that we have placed on the Department of Energy.

Mr. **Gore**. All right, fine.

One final question. Did I earlier state correctly EPA's position with respect to the interpretation of the word "facilities" and whether or not the exemption from the hazardous waste laws has been in your view interpreted way too broadly by DOE?

Mr. **Zeller**. Yes, I think your interpretation is accurate.

Mr. **Gore**. All right, thank you very much.

Mrs. **Lloyd**. Mr. Zeller, one final question for you. What, in your opinion, should be done with the soil at Jefferson Junior High School where some of the soil is contaminated with several hundred parts of mercury per gallon? Should the contaminated fill dirt be removed?

Mr. **Zeller**. I am not really sure I know the answer to that. We have—I have asked a number of experts, in my office relative to this level of mercury in soil. We simply have nothing to fall back on relative to a reference to this kind of a problem.

My recommendation would be to pursue a process which Mr. La Grone mentioned in his statement. He indicated that they had some contacts with the Center for Disease Control. We do not have health effects medical staff in the Environmental Protection Agency, and I think this is a problem that lends itself to CDC for recommendations in terms of what is an answer. I am not greatly alarmed over those action levels, recognizing that mercury in soils is relatively inactive and stays relatively stable.

Mrs. **LLOYD**. Unless there is upward movement in the soil, is that not correct?

Mr. **ZELLER**. That may be, but the form of mercury that we are dealing with and being in soil, it does not appear to be at this point in time any imminent threat. But I think an answer on that should be referred to CDC and the medical people to make that decision.

Mrs. **LLOYD**. Probably it should be seeded with grass to prevent dust?

Mr. **ZELLER**. Certainly as a minimum, that should be done.

Mrs. **LLOYD**. Thank you very much. Thank you gentlemen for being with us.

Our next witness is Dr. Michael T. Bruner, assistant commissioner of the Tennessee Department of Health and Environment who is with us representing the State of Tennessee today. We welcome Dr. Bruner and his associates. Dr. Bruner, would you proceed to the microphone and identify your companions?

Dr. **BRUNER**. Barry Sulkin of the technical staff on my right and Terry Cothron, technical staff, on my left.

Mrs. **LLOYD**. What is the first gentleman's last name?

Dr. **BRUNER**. Barry Sulkin.

Mr. **GORE**. Will you stand and be sworn please?

[Witness sworn.]

Mrs. **LLOYD**. Please proceed with your testimony. We have your complete testimony, and you may proceed as you wish, and the entire statement will be made part of the record.

STATEMENT OF DR. MICHAEL T. BRUNER, ASSISTANT COMMISSIONER, TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT, ACCOMPANIED BY BARRY SULKIN AND TERRY COTHRON, TECHNICAL STAFF, TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT

Dr. **BRUNER**. Thank you. Representatives Gore and Lloyd, this is a refreshing, exciting new day. I am convinced that we are on a threshold of a new, exciting day for environmental improvement in the State of Tennessee. Y-12 is a witch's cauldron of environmental problems.

I am Michael Bruner, assistant commissioner of the Tennessee Department of Health and Environment. I am responsible for the management of all the major environmental regulatory programs for Tennessee, such as surface mining, air and water pollution and hazardous and solid waste.

Federal facilities in Tennessee constitute some of the most significant and severe environmental problems that we face. The Department of Energy's Y-12 operation here in Oak Ridge perfectly exemplifies the validity of this statement. Our information reveals numerous instances of environmental degradation, as well as antiquated and inappropriate waste disposal practices. I am thoroughly convinced that this is true. There are serious and numerous instances of environmental degradation and antiquated environmental practices and technology.

The mercury contamination of the area poses a major health and environmental concern due to the massive quantity of the release, mercury's pervasiveness in the environment and the fact that it both bioaccumulates, which means that it stays around inside living organisms a long time, and is biomagnified in the environment, which means that when the big creatures eat the little creatures, there is lots more of it and it has a tendency to appear to grow in the food chain.

Other known pollutants from Y-12 may have an even more significant impact than mercury. Until there is a comprehensive assessment of all of the problems at Y-12, it would be premature to focus on mercury and mercury alone.

Scientific objectivity concerning mercury and other suspected pollutants should dictate a significant concern for the population of the area. Restricting information of this importance is not in conformity with accepted standards of right and wrong and fails to fulfill DOE's responsibility to the people of Oak Ridge in particular and the people of Tennessee in general.

I am very, very pleased to witness the new philosophy expressed by Joe La Grone. New philosophy, new attitude, promises of new practices, and I am convinced that the new leadership at DOE is genuinely concerned with the cleanup of the old problems at Y-12 and also in the implementation of modern treatment technology.

The DOE reservation is world renown for its facilities, its scientific knowledge and ability to pioneer new technology. It is a disgrace—it is a disgrace—that with these capabilities, environmental concerns and public health have been grossly neglected. It is a bitter pill to swallow. There now exists the need to incorporate this capacity, both financial and technical capacity, from the Oak Ridge reservation, into a concern for environmental protection and public health for the citizens of this State.

The situation emerging at Y-12 does not reflect well on the current regulation practices at Federal facilities. The regulatory jurisdiction is at best an obscure issue, with crossovers between the Environmental Protection Agency, the State of Tennessee, the Nuclear Regulatory Commission, the Atomic Energy Commission, including, in fact, the direct delegation to DOE for its own regulatory programs.

Our Department intends to pursue State responsibilities directly and forcefully, to insure responsibility on the part of other agencies to the best of our ability and to demand clarification where confusion exists. Y-12 is the epitome of the old cliche "the fox guarding the hen house."

As new information and previously restricted information becomes available, the significance of the current state of environmental affairs at DOE Y-12 intensifies. Additional inspections for K-25 and X-10, at ORNL and the gaseous diffusion plant are planned in the near future. If the antiquated waste handling methods at Y-12 are representative of the Oak Ridge operation, then the surface may have only been scratched in terms of the total magnitude of the problem.

The Tennessee Department of Health and Environment will continue to insist that all Federal facilities are Superfund ranked in order to develop a true perspective of the State's old waste problems. These facilities are, and should be, ineligible for Superfund financing but will require investigation and cleanup pursuant to the same criteria that should be applied to the private sector.

Negotiations precipitated by the current inspections and reports resulted in a memorandum of understanding on May 26, between the Department of Energy, the Environmental Protection Agency and the State of Tennessee. Mr. Zeller's formal statement concentrated on that memorandum, and I wish at this time to concur with the vast majority of the statements and have not included any of that discussion in my remarks.

There is one point of slight disagreement and that is a jurisdictional question which you have asked several questions on. This memorandum of understanding applies only to the Y-12 facility and represents the beginning of a complex and monumental task of achieving compliance with environmental statutes. As with industry in the private sector, full compliance can be attained only by the installation of modern wastewater treatment facilities and state-of-the-art procedures for handling, treating, and disposing of hazardous wastes.

The design of such facility, the wastewater treatment facility, received congressional funding in 1979. For various complicated and vague reasons beyond my information at this point, that facility has never moved from the design funding stage in 1979 to the implementation phase in 1983. There were moneys allocated in two different Federal congressional budgets, partially funding the treatment facility, but those moneys have disappeared during the course of various years for various reasons and I would like, Mrs. Lloyd, to have a very clear picture described to you and to me as to just what the chain of events were that led to the facility being designed in 1979 but failed to complete construction in 1983.

Congress is responsible for providing adequate funding for these operations and the Department of Energy will be expected to achieve the same level of compliance as any private industry, subject to the same enforcement actions. A double standard between private industry and Government is unacceptable.

Discussions recently between me and representatives of private industry concluded that any private company would have been expected to have completed a wastewater treatment facility by no later than 1975. I think the record would show that there was rapid development of wastewater treatment facilities as the technology developed and the Water Pollution Control Act was implemented between 1970 and 1975.

I think you will find that there was a substantial investment of private industry funds in the development of wastewater treatment facilities during that period, and I think it is very, very reasonable to assume that the same phenomena should have occurred in Federal facilities. Therefore, I would say that it is reasonable to have expected a sophisticated wastewater handling facility on line in operation at DOE Y-12 by 1975.

Tennessee is a growing State whose natural resources are increasingly important to the economic development and quality of life in our State. Governor Alexander in fact has established the wise development and protection of water resources as a major initiative.

Likewise, health and environmental issues are continuing to attract the attention of Congress. We, as Tennesseans, appreciate this concern and hope for a continuance of such congressional oversight in dealing with problems at Federal facilities, including clarification of regulatory jurisdiction and appropriation of necessary funding for adequate environmental protection, particularly wastewater treatment facilities at DOE Y-12. Working together, we can insure a safe and beautiful environment for the future generations of our State.

Thank you.

[The prepared statement of Dr. Bruner follows:]

MICHAEL T. BRUNER'S TESTIMONY AT CONGRESSIONAL HEARINGS ON THE IMPACT OF MERCURY RELEASES AT THE OAK RIDGE COMPLEX

Oak Ridge, Tennessee
July 6, 1983

Representatives Gore and Bouchard -- Y-12 is a witches cauldron.

I am Michael T. Bruner, Assistant Commissioner of the Tennessee Department of Health and Environment. I am responsible for all activities of the Bureau of Environment, including the state's regulatory programs in water management, solid waste management, which includes hazardous waste, radiological health, air pollution, and surface mine control.

Federal facilities in Tennessee constitute some of the most significant and severe environmental problems in the state. The Department of Energy's (DOE) Y-12 operation in Oak Ridge perfectly exemplifies the validity of this statement. Inspections and requested information by the Division of Water Management reveals numerous instances of environmental degradation, as well as antiquated and inappropriate waste disposal practices.

The mercury contamination of the area poses a major health and environmental concern due to the quantity of release, mercury's pervasiveness, and the fact that it both bioaccumulates and is biomagnified in the environment as it enters the natural food chain. Other known pollutants from Y-12 may have an even more significant impact than mercury. Until there is a comprehensive assessment of all problems at Y-12 it would be premature to focus all our energies on mercury contamination.

Scientific objectivity concerning mercury and other suspected pollutants should dictate a significant concern for the surrounding population. Withholding information of this importance is not only immoral but fails to fulfill DOE's responsibility to the people of Oak Ridge in particular and the people of Tennessee in general.

The DOE facility is world renowned for its facilities, scientific knowledge and ability to pioneer new technology. It is a disgrace that with these capabilities environmental concerns and public health have been ignored. There now exists the need to prioritize this capacity into a concern for environmental protection and public health.

The situation emerging at Y-12 does not reflect well on the current regulation practices at federal facilities. The regulatory jurisdiction is at best an obscured issue, with crossovers between the Environmental Protection Agency, the State of Tennessee, the Nuclear Regulatory Commission and the Atomic Energy Commission, including the direct delegation to the Department of Energy regarding any radioactive materials. The Tennessee Department of Health and Environment intends to pursue state responsibilities directly and forcefully, ensure responsibility on the part of other agencies having jurisdiction, and demand clarification wherever confusion currently exists. Y-12 is the epitome of the cliche "the fox guarding the hen house".

As new information and previously restricted old information becomes available, the significance of the current state of environmental affairs at DOE Y-12 intensifies. Additional inspections for the K-25 and X-10 facilities are planned. If the antiquated waste handling methods at Y-12 are representative of the entire Oak Ridge operation, then the surface may have only been scratched as to the total magnitude of the existing problems.

The Tennessee Department of Health and Environment will continue to insist that all federal facilities be Superfund ranked in order to develop a true perspective of the state's old hazardous waste sites. These facilities are ineligible for Superfund financing but will require investigation and clean up pursuant to the same criteria.

Negotiations precipitated by current inspections and reports resulted in a Memorandum of Understanding on May 26, 1983, between the Department of Energy, the Environmental Protection Agency and the Tennessee Department of Health and Environment. This Memorandum of Understanding applies only to the Y-12 facility and represents the very beginning of the complex and monumental task of achieving compliance with existing environmental statutes. As with industry in the private sector, full compliance can be attained only by the installation of modern wastewater treatment facilities and state-of-the-art procedures for handling, treating and disposing of solid and hazardous wastes. Congress must be responsible for providing adequate funding for these operations as the Department of Energy will be expected to achieve the same level of compliance as any private industry and subject to the same enforcement actions. A double standard between private industry and government is unacceptable.

Tennessee is a growing state whose natural resources are becoming increasingly important to economic development and quality of life. Governor Lamar Alexander recognizes this fact and has established the wise development and protection of water resources as a major initiative. Likewise, health and environmental issues are continuing to attract the attention of Congress. We as Tennesseans appreciate this concern and hope for the continuance of such congressional oversight in dealing with problems at federal facilities, including clarification of regulatory jurisdiction and appropriation of necessary funding for adequate environmental protection and wastewater treatment facilities. Working together we can ensure a safe and beautiful Tennessee for future generations.

Mrs. LLOYD. Thank you very much, Dr. Bruner. I think we certainly do agree that there is a definite need for the central pollution control facility here. Unfortunately, the funds were cut out of the 1982 budget. The Atomic Energy Defense activities appropriations was cut $51 million but we certainly hope that sufficient funding can be included in the 1984 budget so we can move on with this very vital project. We are in complete agreement on this area.

Following up some of our questions, you stated in your opening remarks that the Department uses antiquated and inappropriate waste disposal practices. I really want to follow up on this to get more information.

I wish you would just identify for our committee what these inappropriate and antiquated waste disposal practices are.

Dr. BRUNER. I will be glad to. It is directly related to my statement on sophisticated waste treatment facilities.

If you would go to Y-12, you would see first a very massive facility. You would see 227 direct pipes from the Y-12 facility into what is commonly called the industrial ditch in the headwaters or the very beginning of the East Fork Poplar Creek. It is according to who you are talking to, those terms are—mean the same thing, according to who you are talking to.

The ditch empties into a large pond which is a settling pond more or less.

Mrs. LLOYD. That is correct.

Dr. BRUNER. The discharges from Y-12 therefore, those 227 pipes, some of them dead and having no discharge, some of them having process water discharged, some of them having only cooling water and drainage discharge, into New Hope Pond, is an antiquated type of treatment, and that is that you pour the stuff into a big holding basin, some of the bad stuff filters out——

Mrs. LLOYD. I think we all agree that we have facilities here that are 20 years old to try and take care of present day problems, we agree on the facilities, but I think that I was referring to—do you feel that they are not using their facilities and the information that is available to them?

Dr. BRUNER. Oh, they are absolutely not, they absolutely and without a doubt——

Mrs. LLOYD. Do you feel that DOE is abdicating their responsibilities?

Dr. BRUNER [continuing]. Had the technical capacity 10 years ago to deal with this problem effectively and it was not dealt with effectively.

Mrs. LLOYD. Do you feel that perhaps there may be some areas in the State of Tennessee that have Superfund funding that have not addressed all the problems that you are expecting to be addressed here in Oak Ridge? There are also jurisdictions in the State of Tennessee.

Dr. BRUNER. Is that a question or——

Mrs. LLOYD. It is a question.

Dr. BRUNER. Will you rephrase it for me, please?

Mrs. LLOYD. Do you feel under the strict guidelines that you are evaluating and judging the processing and the policies here at Oak Ridge would equally apply to other areas in the State of Tennessee under your jurisdiction that would certainly be a candidate for Superfund funding?

Do you feel that you are applying the same criteria in other areas of the State?

Dr. **Bruner**. I do.

Mrs. **Lloyd**. You have other areas in the State that have Superfund funding available that have their act all together?

Dr. **Bruner**. We might be mixing apples and oranges when we are talking about Superfund and——

Mrs. **Lloyd**. Well, in your statement you stated that they should abide by Superfund criteria.

Dr. **Bruner**. Yes, I did.

Mrs. **Lloyd**. Well now, do you not expect there are other problems in your area that might be a Superfund candidate, they should have the same criteria?

Dr. **Bruner**. Yes, I do.

Mrs. **Lloyd**. In other words, you have everything in the State taken care of?

Dr. **Bruner**. Well, I would not draw the conclusion "taken care of," no, but I would make the statement, yes, the same criteria should apply and do apply except there is an exemption as Federal facilities from the Superfund funding.

Now, that is very reasonable because the source of dollars for Superfund is private industry. Yet, there should be a way to rank all industrials including Federal facilities in a single ranking so that we in Tennessee and others in the country can determine the relative danger of all types of——

Mrs. **Lloyd**. I yield to my colleague for a question.

Mr. **Gore**. I was just going to cite one specific example of what I believe she is getting at.

I and representatives of your department visited a Superfund site for which emergency action was recommended a long time ago out just east of Memphis, the Galloway Pits site—6 months ago, I guess—we were there in February, and on that day representatives of your department and EPA said that an agreement had just been reached to clean it up and yet here we are in July and it is my understanding that not a single step has been taken to remedy that problem.

Now, it may not be your fault, it may be EPA, but I think that underscores the point that my colleague was trying to make, that there are quite a few problems around the State that need attention.

If the impression from the State is that this is it and everything else is in good shape, that is not the case.

Dr. **Bruner**. I would have to stand corrected. I did not mean to say that everything was in good shape. What I meant to say was that any major industrial source—any major industrial source—would have been focusing on wastewater treatment facilities in the very early 1970's, from 1970 to 1975. And today in this facility—the only reference there that I intended was in terms of wastewater treatment facility for process water from major industrial sites—we are at Y-12 DOE at best operating in a 1970 mode in relationship to wastewater treatment.

I did not mean for that to be broadened in scope to—I am sorry I confused you, Mrs. Lloyd.

Mr. **Gore**. No, I do not think we were confused.

Mrs. **Lloyd**. I do not think we are confused at all, Dr. Bruner. I am just really trying to get to the point that we feel we have problems here, we have very serious problems, that is the reason we are here today, but I was trying to really find out if you are not using this issue maybe to try and take off the heat from some other areas in the State where you do have other problems. That was the point I was trying to make with you, Dr. Bruner.

In paragraph 4 of your statement, you said that you felt that a comprehensive assessment of environmental problems at the complex is necessary. My question to you is, have you made a request to DOE for a comprehensive assessment, and have they cooperated with you in such a request?

Dr. **Bruner**. That was consummated in the Memorandum of Understanding on the Y-12 operation in the May 26 MOU.

Mrs. **Lloyd**. Thank you very much.

Mr. Gore?

Mr. **Gore**. Thank you very much.

I would like to single out you, Mr. Sulkin, and compliment you for your dedication to your job. I think you have really been persistent in making certain that the right thing was done in these matters.

I think that there is an important distinction, a subtle distinction but a very important one, between, on the one hand, making absolutely certain, Dr. Bruner, that these problems are corrected, and, on the other hand, not creating an alarmed attitude on the part of residents that is not justified by the facts.

This is an extremely serious situation and it warrants immediate action. At the same time, the leading experts that we have consulted with seem to be pretty unanimous in their conclusion that there is no present threat to human health as far as the citizens of Oak Ridge are concerned.

Your statement appears to say that there is a major health concern and you refer to the bioaccumulation and biomagnification of mercury in the environment and in the food chain.

Again, this is a subtle distinction but I think a critical one. If mercury is contained in sediments, then it is unlikey to biomagnify in fish.

Would you agree with that?

Mr. **Cothron**. No, I would not agree with that, sir.

Mr. **Gore**. All right. Tell me why.

Mr. **Cothron**. Well, I am sure there are others here in the audience who know quite a deal more about mercury's state in the environment than I do, but it is my understanding that bioaccumulation can start with sediment contamination and move up the food chain from there.

Mr. **Gore** Well, we are going to have a scientist I regard as a leading—many regard as the leading expert on mercury in the world today on the expert panel, and other scientists who can really speak to this question a lot better than either you or I can.

But I just wanted to note that there is that important distinction and I am just wondering in light of your statement here, Dr.

Bruner, whether you disagree with EPA's conclusion that there is no present threat to human health as far as the residents of Oak Ridge are concerned.

Dr. **Bruner**. I absolutely agree with EPA's statement and it is treacherous in selection of words in our language, very difficult.

I agree 100 percent with, and I imagine you can pursue this in the form of a question, that Howard Zeller agrees with my statement that concern is one level, that imminent hazard and a health threat is another.

We are both concerned. Neither of us believes that there is an imminent and immediate health threat to the citizens. Those are meant to be consistent statements.

Mr. **Gore**. All right. Well, I wanted to clarify that point because all participants are concerned that this be dealt with immediately.

At the same time, the citizens of Oak Ridge deserve an accurate and full account of exactly what the threat is, and I do think it is important to underscore the fact that there is not an imminent threat to human health as far as the Oak Ridge citizenry is concerned.

I just did not want your statement to leave an implication that conflicted with that. It is a generalized statement and we will pursue this question of bioaccumulation and biomagnification in the food chain with later witnesses.

I believe—wait 1 second here. Are you satisfied with the memorandum of understanding, Dr. Bruner?

Dr. **Bruner**. Yes; I am satisfied with the substance. I am satisfied. You could place that in terms of present timeframes. Where we have been, certainly that is not—I do not mean to imply that that is a perfect document. We feel good about that and we feel it is major progress in the right direction or I would not have signed it. I did not sign that under duress. I signed that as a major step forward in a road map to getting the environmental problems corrected at Y-12 DOE.

Mr. **Gore**. Mr. Sulkin, I know you do not disagree with you superior here at the table, but are there any concerns that we ought to be looking at with respect to the Memorandum of Understanding?

Mr. **Sulkin**. The MOU is basically a study document. It sets out programs to look at the problem. It does not say everything that is illegal will stop. That is where it falls short.

Mr. **Gore**. Pardon me?

Mr. **Sulkin**. It falls short. It does not say stop illegal discharges by a specific date. It generalizes the study, so that is where we feel like it needs more definition.

Mr. **Gore**. So there is another step that needs to be taken, in your view?

Mr. **Sulkin**. In the introduction to the document, it says that it is preliminary and does not preclude further action.

Mr. **Gore**. When is it going to be finalized?

Mr. **Sulkin**. I cannot tell you that.

Dr. **Bruner**. Well, again, I doubt that there will be a single point in time where everything will come together in a single document.

I would see this as a series of steps that will be taken over the next several years, perhaps not even all of them that are in there presently, so I would see this as an evolving document.

This is the genesis. This is the beginning, a major contribution to where we are, not intended to be the whole Bible at this point.

I think there will be a lot of detail, a lot of guidance that will be evolving on 30, 60, 90 day intervals for a long time, more detail.

Mr. **Gore**. Yes. Now, do you agree with the statement that Mr. La Grone seems to be completely and fully committed to solving this problem and getting it behind him?

Dr. **Bruner**. Yes.

Mr. **Gore**. You have no concerns about that fact?

Dr. **Bruner**. Of course I have concerns, but I have, like I am sure you do, in judgment of character when you meet someone, I have been very impressed with his commitment and his desire to be open with the people, to be open with us and to commit to improvement. So that is about the extent of it. I have known him only 30 to 60 days.

Mr. **Gore**. All right. Those of us who have overseen the Department of Energy's operations around the country have been familiar with his work elsewhere for quite some time and I believe that we are fortunate to have him directing the efforts.

Those are all the questions I have.

Mrs. **Lloyd**. Thank you very much, Mr. Gore.

Dr. Bruner, thank you and your associates for being with us for this portion of our hearing this morning. We do appreciate the audience participation this morning and we apologize that our schedule is running a little bit overtime, but we think that it is pertinent to facts and certainly worthwhile.

Our next witness is David Freeman, Director of Tennessee Valley Authority.

Please identify the gentlemen who are accompanying you. You are really a very prominent visitor to our hearings in Washington and we welcome you here today.

Mr. **Freeman**. Thank you, Madam Chairman. I have with me Ralph Brooks——

Mrs. **Lloyd**. Excuse me. Could we have order, please?

Thank you.

Mr. **Freeman**. I have with me on my left Ralph Brooks of our Division of Air and Water Resources, Larry Farr and Jack Milligan from our Water Quality Branch and Bill McMaster, who is our expert on ground water and geology in the Oak Ridge area.

Mr. **Gore**. Would you stand and be sworn? We are swearing all of our witnesses in this hearing.

[Witnesses sworn.]

Mrs. **Lloyd**. Mr. Freeman, proceed as you wish, and your complete testimony will be made a part of the record today.

STATEMENTS OF DAVID FREEMAN, DIRECTOR, TENNESSEE VALLEY AUTHORITY, ACCOMPANIED BY RALPH BROOKS, DIVISION OF AIR AND WATER RESOURCES, TVA; LARRY FARR AND JACK MILLIGAN, WATER QUALITY BRANCH, TVA; AND BILL McMASTER, EXPERT ON GROUND WATER AND GEOLOGY IN OAK RIDGE AREA

Mr. FREEMAN. Thank you, Madam Chairman. I shall try to be brief in the summary of our testimony.

The Tennessee Valley Authority is here today because TVA does have statutory responsibility for the proper use of the water of the Tennessee River.

We have no regulatory authority and in the last 5 years since Dick Freeman and I have been on the TVA Board, I believe it is fair to say that TVA has assumed a role as a watchdog over the environment in this valley. And we have blown the whistle where we have seen pollution that we felt needed to be called to the attention of the people of the valley. I think the people of the valley have come to expect TVA to perform that role and participate as the strong right arm, if I might say, of the regulatory agencies in the State of Tennessee and at the Federal level to assure that cost effective cleanup operations are undertaken and followed through. So we are very happy to appear before you in that role.

As you said, Madam Chairman, I have appeared before a number of congressional committees and there is usually a perfunctory statement about being happy to be here and that this hearing is important.

I make that statement this morning not as a perfunctory matter. I believe that this hearing is probably one of the most important hearings that has ever been held in east Tennessee or in the Tennessee Valley.

It shows the strong personal interest of two of the most prominent members of our valley delegation in bringing the public's attention to a problem that has needed public attention. I feel very confident that what will come out of this hearing will be a record that will provide the basis for the cleanup efforts that everyone acknowledges needs to be done.

We are not here, Madam Chairman, to curse the past. We are here to offer our expertise and our impartial advice and help to the Department of Energy and the State of Tennessee and the Environmental Protection Agency and to the Congress, to get this matter behind us and to find out for sure exactly where the mercury is and where other pollutants may be and to provide the data collection system and then, after an intense data collection effort, the cleanup program that needs to be undertaken. That is the thrust of our testimony.

We have participated in similar efforts with respect to two other incidents involving mercury in the Tennessee Valley and so we feel that we have some expertise to offer in that respect.

I must make one observation since Mr. Wing of the Department of Energy chose to delve into the relations with TVA in the past.

As a managing director of this agency, I think with the reputation for environmental sensitivity, I first learned of the 2.4 million mercury spill in the newspaper over 2 months ago. This agency.

under direction of the Board, has put out two publications about the water in the valley.

There was no mention of this spill because we did not know about it, and the TVA people who attended that meeting in 1977 were not told the alarming fact that there was this large spill of mercury. They were not given the information that would have enabled them to be alarmed and to gather more data. I think the record should show that.

But, as I said at the beginning of my testimony, we are not here to delve into what could have been done. We want to impress upon the committee that there is a lot that needs to be done today.

The committee should know that the mercury spills are only one form of the potentially harmful pollution in the Oak Ridge area. TVA's environmental experts have observed discharges of pollutants directly in the flowing streams and practices that provide no complete assurance of adequate controls that would eliminate environmental degradation.

We do not know the precise pollutants that are being discharged except that DOE has reported to the State that they include such highly toxic items as PCB's and uranium, beryllium, thorium, lead, and plutonium.

With respect to those measures it is obvious that corrective measures are needed. I am delighted at the attitude of Joe La Grone and the evidence presented this morning that corrective measures are under way.

On the basis of what we now know—and I want to stress that our knowledge is very limited as to where the mercury is and what is happening to the other pollutants—we are persuaded that an extensive factual study and cleanup is urgently needed.

We have found fish in the upper reaches of the East Fork Poplar Creek that on an individual basis exceed the FDA's permissible limits.

As we get further downstream, the level of mercury is below the permissible limits, but these findings do indicate that the mercury has moved through the waterways and we do not know whether the mercury levels are going up or down, and that is an important fact that needs to be determined from further data.

We think that detailed site surveys that have been suggested of the entire drainage area, including Y-12 and the gaseous diffusion site, must be made.

We need to trace the possible pathway through the air, water and soil to be more certain than we are today that there is no potential harm.

The effort that may very well be needed, I believe the committee should understand, could be extensive. We believe that the cleanup may require dredging the Poplar Creek, Bear Creek, and White Oak Creek drainages in part or entirety.

We do not know that that will be necessary, but our experience with other mercury spills of this nature suggests that extensive contamination might require such dredging and might require the evacuation of sites in which sediments have previously been moved.

If gardens containing contaminated segiments are found, we believe that they must be eliminated. In case the pollutants cannot be cleaned up, their movement must be stopped by constructing retention dams or channeling water around the contaminated areas.

If ground water contamination exists, water from important aquifers must be isolated and these techniques are ones that TVA is familiar with.

The Tennessee Valley Authority is committed to the people of the Valley and we are committed to maintaining a high quality environment in this Valley.

We want to work with the Department of Energy. We believe that, as a polluter, they have a responsibility to pay for these studies and the cleanup. But we stand ready to assist in any way that they and the State of Tennessee and the Environmental Protection Agency would wish.

I would just add one personal note, if I may, to the testimony, Madam Chairman.

I have been a citizen of this part of the country most of my life. I grew up in Chattanooga and I lived a long number of years in Knoxville.

I have always regarded Oak Ridge and bragged about Oak Ridge as the center of technological excellence.

I firmly believe that we have in Oak Ridge and Knoxville the nucleus of a high technology economy that can move forward through the rest of this century and the next century, but I must say that the manner in which this mercury spill has finally been released to the public and what we are finding in the antiquated pollution control equipment that exists on this reservation is that the technical excellence obviously stopped with the limits of the plants, and I am just delighted with the attitude of Joe La Grone. I believe that we have to play catchup ball.

I think that it is absolutely necessary that this effort go forward on an urgent basis so that whatever questions have been raised can be eliminated so that this area's opportunities for economic growth can flourish, because at the moment I believe that the situation casts a dim cloud over that growth and that cloud has just got to be removed.

We have too much progress ahead of us to let a situation exist—and I think it is just unfair to the people of this area to have a defense project cast a cloud on us and the cleanup effort must be made because whatever the cost is, it is part of our defense program and I am sure that our able representatives in Congress will pursue that.

Mr. **Gore**. Mr. Freeman, if I may interject at that point, I really agree with the sentiment you just expressed.

I think that that cloud has to be removed on an urgent basis, and that the place to begin is with a full and accurate accounting of exactly what the facts are and an absolute commitment and determination to solving all problems that exist; an open effort that involves the public and all interested citizens in providing absolute assurance that these problems are going to be solved; that they are going to be put behind us, and the effort starts today.

Mr. **Freeman**. That is why I am so delighted with this hearing, because I believe it is providing a platform where Mr. La Grone and the others involved can make that pledge and we can move from here and get that done.

I would just like to add one final thought.

As a person who has had some personal experience in trying to open up an agency and develop a greater sense of environmental sensitivity, I would say to you that Mr. La Grone needs your help. He needs the support of the committee. He needs the support of the public opinion in this area because he has got a very formidable job on his hands, and I think all of us here need to pledge ourselves to help him overcome whatever obstacles may exist within the bureaucratic process that he has to deal with.

Thank you.

[The prepared statement of Mr. Freeman follows:]

TESTIMONY BY S. DAVID FREEMAN, DIRECTOR
TENNESSEE VALLEY AUTHORITY
BEFORE THE SUBCOMMITTEE ON ENERGY RESEARCH AND PRODUCTION
AND THE SUBCOMMITTEE ON INVESTIGATION AND OVERSIGHT
OF THE COMMITTEE OF SCIENCE AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES
ON
THE IMPACT OF MERCURY RELEASE AT THE OAK RIDGE COMPLEX
JULY 11, 1983

I AM PLEASED TO BE HERE IN RESPONSE TO YOUR INVITATION. AS DID OTHER CITIZENS OF THE VALLEY, TVA LEARNED TWO MONTHS AGO THAT A TOTAL OF 2.4 MILLION POUNDS OF MERCURY HAD BEEN ALLOWED TO ESCAPE INTO THE ENVIRONMENT OR WERE UNACCOUNTED FOR AT THE DEPARTMENT OF ENERGY FACILITIES IN OAK RIDGE, TENNESSEE BETWEEN THE YEARS 1950 AND 1977.

THIS ALARMING DISCOVERY INITIATED INVESTIGATIONS WHICH REVEALED THAT A NUMBER OF AREAS ON THE DOE RESERVATION ARE HIGHLY CONTAMINATED, NOT ONLY WITH MERCURY, BUT WITH LARGE AMOUNTS OF ORGANIC CHEMICALS, TOXIC SOLVENTS, AND RADIOACTIVE CHEMICAL COMPOUNDS.

THE COMMITTEE SHOULD KNOW THAT THE MERCURY SPILLS ARE ONLY ONE FORM OF THE POTENTIALLY HARMFUL POLLUTION IN THE OAK RIDGE AREA. TVA'S ENVIRONMENTAL EXPERTS HAVE OBSERVED DISCHARGES OF POLLUTANTS DIRECTLY INTO FLOWING STREAMS AND PRACTICES THAT PROVIDE NO ASSURANCE OF ADEQUATE CONTROLS

AGAINST ENVIRONMENTAL DEGRADATION. WE DO NOT KNOW THE PRECISE POLLUTANTS BEING DISCHARGED, EXCEPT THAT DOE HAS REPORTED TO THE STATE THAT THEY INCLUDE SUCH HIGHLY TOXIC ITEMS AS PCBS, URANIUM, BERILLIUM, THORIUM, LEAD, AND PLUTONIUM. CORRECTIVE MEASURES NEED TO BE TAKEN AT ONCE.

MY TESTIMONY TODAY SPEAKS PRIMARILY TO THE ISSUE OF MERCURY BECAUSE WE WERE NOT FULLY AWARE OF THE INADEQUATE HANDLING AND DISPOSAL OF OTHER POLLUTANTS UNTIL OUR ON-SIT INSPECTION ON JULY 6TH. HOWEVER, THE TYPE OF INVESTIGATION AND ACTION WE PROPOSE FOR MERCURY IS NOW DEEMED NECESSARY FOR THE WHOLE SPECTRUM OF POLLUTANTS BEING DISCHARGED.

THESE TOXIC MATERIALS ARE ENTERING OUR ENVIRONMENT THROUGH THE UPPER EAST FORK POPLAR CREEK, BEAR CREEK, AND WHITE OAK CREEK--STREAMS THAT FLOW THROUGH THE OAK RIDGE AREA AND INTO NEARBY RIVERS AND LAKES OF THE TENNESSEE RIVER SYSTEM FOR WHICH TVA HAS CERTAIN STATUTORY RESPONSIBILITIES.

ONE OF TVA'S LEGISLATED RESPONSIBILITIES IS "TO AID FURTHER THE PROPER USE, CONSERVATION, AND DEVELOPMENT OF THE NATURAL RESOURCES OF THE TENNESSEE RIVER DRAINAGE BASIN... AND TO PROVIDE FOR THE GENERAL WELFARE OF THE CITIZENS OF SAID AREAS...." ALTHOUGH TVA HAS ALMOST NO REGULATORY AUTHORITY, THE AGENCY HAS ATTEMPTED IN RECENT YEARS TO BECOME A MAJOR FORCE IN THE REGION FOR ENVIRONMENTAL PROTECTION AND CORRECTION.

Concerned Valley residents have come to expect us to develop and publicize information on environmental dangers, and I believe they have confidence in our data, our objectivity, and our technical judgment. TVA now works closely with State and Federal regulatory agencies to deal with pollution that could affect the health and welfare of the people in general and TVA reservoirs in particular.

In recent years, TVA has participated with those regulatory agencies and with private industries in the assessment and subsequent cleanup of two other major mercury pollution problems in the Valley. One contaminated site is the North Fork Holston River downstream from Saltville, Virgina. The other is the Pickwick Reservoir contaminated by a discharge near Muscle Shoals, Alabama. Through our experience and study, we have learned a great deal about mercury and its behavior in the environment. (For a technical description of mercury's nature and its environmental behavior refer to the attached appendix.)

TVA's experience in working with other organizations to evaluate and address previous chemical spills and our commitment to environmental protection will be valuable in finding solutions to the problems that face us in Oak Ridge.

On the basis of what we now know--and our knowledge is still limited-- we are persuaded that an extensive study and cleanup are urgently needed. Consider the following facts of the case:

1) Numerous mercury discharges of unknown amounts took place from 1950 to 1977. Of the total 2.4 million pounds, each of the five largest spills fell somewhere in the 22,000 pound to 100,000 pound range.

2) While most of the spills were onto the ground or into water, in 1956 30,000 pounds of mercury were vaporized and discharged into the atmosphere.

3) Fish in the upper reaches of the East Fork Popular Creek exceed FDA's "action level" a contamination level that prevents such fish from being sold across state lines. We are detecting, for the first time, elevated levels of mercury in the fish of the Clinch River arm of the Watts Bar Reservoir in the area of the DOE reservation. The level of mercury found in fish here does not exceed the FDA's action level. These recent findings indicate that movement of contamination within the reservoir is occurring.

4) Specific areas on the DOE reservation in Oak Ridge are highly contaminated not only with mercury, but with toxic organic chemicals and radioactive chemical compounds. These areas include ponds and disposal areas on the reservation which, for the most part, have been poorly designed and operated.

Before specific remedies for these various problems can be undertaken more information is needed. Getting it will be expensive, as will whatever cleanup measures are called for. But the health and welfare of the people of this region and the livability of the environment demand that the investment be made.

Based on our experience elsewhere it is certain that specific actions must be taken immediately. These actions should include a thorough analysis of all existing data pertaining to mercury releases at the DOE site as well as all other potential contaminants. For starters the list should include PCBs, uranium, berillium, thorium, lead, and plutonium.

Detailed site surveys of the entire drainage area, inlcuding the Y-12 and gaseous diffusion plant sites, must be made. Estimates of the movement of pollutants through the various pathways of air, water, and soil must be made in order to specify the true nature and extent of environmental contamination.

SOME OF THE QUESTIONS THAT NEED TO BE ANSWERED WITH HARD DATA INCLUDE THE FOLLOWING:

1) WHAT LEVELS OF MERCURY AND OTHER CONTAMINANTS ARE FOUND IN THE GROUNDWATER BELOW OAK RIDGE, AND WHAT PROBLEMS DOES THIS POSE?

2) HOW LONG WILL THE EXISTING CONTAMINATION CONTINUE TO BE A PROBLEM, OR ARE THERE FEASIBLE MEANS TO HALT ENVIRONMENTAL DAMAGE?

3) ARE THERE ANY CONTINUING SOURCES OF CONTAMINATION, AND WILL THE EXISTING CONTAMINATION ACT AS A CONTINUING SOURCE TO POPLAR CREEK, THE CLINCH RIVER, AND WATTS BAR RESERVOIR?

4) ARE THE MERCURY CONCENTRATIONS IN FISH AND SEDIMENTS IN EAST FORK POPLAR CREEK, POPLAR CREEK, THE CLINCH RIVER, AND WATTS BAR RESERVOIR INCREASING OR DECREASING? IF THEY ARE GOING UP, THIS MAY MEAN THAT POLLUTION IS CURRENTLY SPREADING OUT FROM THE RESERVATION. IF THEY ARE GOING DOWN, THIS MAY MEAN THAT THE POLLUTION HAS BEEN SPREADING FOR A LONG TIME AND THE CONTAMINANTS ARE NOW BEING ABSORBED INTO THE FOOD CHAIN. MORE NEEDS TO BE KNOWN ABOUT THIS IMPORTANT ISSUE.

5) IS THE MERCURY TIED UP IN SEDIMENTS EVENLY DISTRIBUTED ALONG CREEKBEDS OR ARE THERE IDENTIFIABLE LOCATIONS, SUCH AS FRACTURE ZONES, WHERE HIGHER CONCENTRATIONS ARE PRESENT?

6) IS THERE AN IDENTIFIABLE PEAK ZONE OF CONTAMINATION OF THE FISH?

7) ARE ANY OTHER CREEKS IN THE VICINITY CONTAMINATED?

8) TO WHAT EXTENT IS THE MERCURY ALREADY DEPOSITED BEING CONVERTED TO METHYL MERCURY?

WE VIEW PROGRESS IN ANSWERING THESE QUESTIONS IN THE NEXT SIX MONTHS AS CRITICAL TO THE EVENTUAL CONTAINMENT AND CLEANUP THAT MUST TAKE PLACE. THE FIRST SIX MONTHS OF EFFORT SHOULD INCLUDE THE COLLECTION OF SUFFICIENT DATA TO DETERMINE WHERE THE MERCURY AND OTHER POLLUTANTS ARE AND HOW THEY ARE CURRENTLY BEHAVING IN THE ENVIRONMENT, AS WELL AS THEIR DANGER TO PUBLIC HEALTH. WE RECONGNIZE THE NEED FOR IMMEDIATE ACTION, BUT REALIZE THAT ANSWERS TO ALL THE ABOVE QUESTIONS WILL NOT BE OBTAINED IN JUST SIX MONTHS. IN MANY CASES RELEVANT DATA DOES NOT EXIST. IN OTHER CASES, THE DATA PROVIDED TO US IS INCOMPLETE, AT BEST.

THE INITIAL SIX MONTHS STUDY CAN BE CONDUCTED FOR COSTS IN THE RANGE OF $200,000 TO $500,000. THAT RANGE WOULD

COVER DIAGNOSING THE MERCURY PROBLEM ALONE. INCLUDING OTHER POLLUTANTS IN THE INVESTIGATION WILL INCREASE COSTS, PERHAPS DRAMATICALLY. AFTER A THOROUGH EXAMINATION OF THE PLACEMENT AND BEHAVIOR OF THE CONTAMINANTS, TVA, IN COOPERATION WITH OTHER INTERESTED AGENCIES, CAN BEGIN TO DESIGN A CLEANUP STRATEGY TO BE APPROVED BY EPA.

DOE MUST FINANCE BOTH THE SIX MONTH STUDY AND THE EXTENSIVE EFFORTS THAT NEED TO FOLLOW BECAUSE THEY ARE THE POLLUTERS AND TVA HAS NO FUNDS FOR SUCH PURPOSES.

OBVIOUSLY, THE FINAL STEPS OF CONTAINMENT AND CLEANUP ARE GOING TO BE LARGE UNDERTAKINGS. IF THE MOVEMENT OF MERCURY THROUGH STREAM AND CREEK SEDIMENTS IS FOUND TO BE ALARMINGLY ACTIVE, THE CLEANUP MAY REQUIRE DREDGING THE POPLAR CREEK, BEAR CREEK, AND WHITE OAK CREEK DRAINAGES IN PART OR IN ENTIRETY. SUCH EXTENSIVE CONTAMINATION MIGHT ALSO REQUIRE THE EXCAVATION OF SITES TO WHICH SEDIMENTS HAVE PREVIOUSLY BEEN MOVED. IF GARDENS THAT CONTAIN CONTAMINATED SEDIMENTS ARE FOUND, THEY MUST BE ELIMINATED.

IN CASE THE POLLUTANTS CAN NOT BE CLEANED UP, THEIR MOVEMENT MUST BE STOPPED BY CONSTRUCTING RETENTION DAMS OR CHANNELING WATER AROUND CONTAMINATED AREAS. IF GROUNDWATER CONTAMINATION EXISTS, WATER FROM IMPORTANT AQUIFERS MUST BE ISOLATED. THE USE OF GROUT CURTAINS OR OTHER TECHNIQUES COULD BE EMPLOYED.

THE LARGE NUMBER OF TOXIC PONDS ON THE DOE SITE WILL ALWAYS BE OF CONCERN UNLESS THEY CAN BE CONTAINED BY PERMANENT COVERING OR REMOVED AND SHIPPED TO APPROPRIATE BURIAL GROUNDS.

TVA IS COMMITTED TO THE PEOPLE AND ENVIRONMENT OF THE TENNESSEE VALLEY, AND WE WANT TO WORK WITH THE DEPARTMENT OF ENERGY, AS WELL AS OTHERS, IN ENSURING THAT THE QUALITY OF LIFE IN THIS REGION REMAINS HIGH. OUR EXPERIENCE IN ADDRESSING THE PROBLEMS OF MERCURY AND OTHER CONTAMINANTS MAKES US AN ABLE PARTNER IN ANY CLEANUP CAMPAIGN.

# # #

APPENDIX

BEHAVIOR OF MERCURY IN THE ENVIRONMENT

Mercury can enter the ecosystem in a variety of ways. It can enter naturally through the erosion of mercury-containing minerals or by deposition from atmospheric sources. It can enter from man's activities through the direct discharge of industrial wastes or indirectly through disposal or spillage onto the ground where it can contaminate groundwater and subsequently be carried underground to discharge into a lake or stream. Whatever the source, most of the mercury tends to migrate ultimately to large aquatic systems such as our region's reservoirs and to cycle through the food chain to man. Those amounts remaining inert in soils may be exposed even after long periods of time and then introduced to the food chain at that time.

General Chemistry

Mercury is perhaps best known in its shiny, metallic, liquid form but it also commonly exists in nature as a salt or gaseous compound. Because mercury is highly volatile, SOME PORTION OF THE TOTAL VAPORIZES WHEN EXPOSED TO THE ATMOSPHERE. IT IS EASILY OXIDIZED AND IN MOST NATURAL ENVIRONMENTS PRECIPITATES OUT IN A VARIETY OF STATES WHICH MAY THEN REACT WITH OTHER COMPOUNDS, EITHER TO FORM INORGANIC SALTS OR TO BECOME MORE PERMANENTLY BOUND TO SOILS.

THE TRANSFORMATION OF GREATEST INTEREST IN ECOSYSTEMS IS THE BIOLOGICAL OR PURELY CHEMICAL CONVERSION OF METALLIC AND INORGANIC FORMS INTO ORGANIC MERCURIC COMPOUNDS. THE FORMATION OF THE METHYL MERCURY COMPOUND IS SIGNIFICANT IN THAT THE ELEMENT BECOMES MORE SOLUBLE AND REACTIVE SO THAT IT CAN BE MOBILIZED BIOLOGICALLY.

IN SHORT, IT BECOMES MUCH MORE TOXIC. OBVIOUSLY, THE CHEMISTRY OF THE SPECIES MAKES IT IMPERATIVE TO DEFINE NOT ONLY ITS LOCATION IN THE OAK RIDGE AREA BUT THE FORM IN WHICH IT EXISTS THERE.

MERCURY IN THE ATMOSPHERE

MERCURY IS TOXIC IN ALL ITS COMMON FORMS. IT IS RELEASED INTO THE ATMOSPHERE FROM A VARIETY OF SOURCES. ALTHOUGH NO AMBIENT AIR STANDARD CURRENTLY EXISTS FOR MERCURY, THE MAXIMUM RECOMMENDED EXPOSURE LEVEL FOR WORKERS

IS 0.05 MILLIGRAMS PER CUBIC METER. GENERALLY, AMBIENT AIR QUALITY STANDARDS ARE SET AT LEVELS 100 TIMES LOWER THAN THOSE ACCEPTABLE FOR WORKER EXPOSURE. MERCURY IS RELEASED INTO THE ATMOSPHERE FROM A VARIETY OF SOURCES.

THE BULK OF MERCURY RELEASED TO THE ATMOSPHERE IS A METALLIC VAPOR. THIS GAS SHOWS NO SIGNIFICANT PROPENSITY FOR AEROSOL FORMATION AND APPEARS TO BE TRANSPORTED PRIMARILY IN THE GAS PHASE. IT IS REMOVED FROM THE ATMOSPHERE BY WET AND DRY DEPOSITION. HOWEVER, MUCH OF THE MERCURY THUS DEPOSITED CAN BE REVAPORIZED WITHIN ONE OR TWO DAYS. THE RESUSPENDED MERCURY IS THEN SUBJECT TO FURTHER TRANSPORT. THE RATE OF RESUSPENSION IS DEPENDENT ON AMBIENT TEMPERATURE; THEREFORE, THIS PHENOMENON WOULD BE ESPECIALLY IMPORTANT IN THE SOUTHERN UNITED STATES. THESE CYCLES OF DEPOSITION AND RESUSPENSION CAN LEAD TO A "LEAPFROG" EFFECT IN WHICH EMITTED MERCURY CAN BE EFFECTIVELY TRANSPORTED OVER EXTREMELY LONG DISTANCES. HOWEVER, IT APPEARS THAT MERCURY LEAVES THE ATMOSPHERE MOST READILY OVER LARGE WATER BODIES; THUS THERE MAY BE AN ACCUMULATION OF MERCURY IN FRESHWATER SYSTEMS AT LEVELS EXCEEDING THOSE FOUND IN NEIGHBORING LAND MASSES. THE MERCURY THAT REMAINS ON LAND BECOMES HIGHLY ENRICHED IN PLANTS AND ANIMALS AS IT MOVES THROUGH THE FOOD CHAIN. IT IS TOXIC TO SENSITIVE SPECIES AT LEVELS EVEN SLIGHTLY HIGHER THAN THOSE OCCURRING NATURALLY.

Mercury in Surface Water

Mercury released to the surface water environment is relatively insoluble and either settles out rapidly or is more likely combined with suspended particles. It can then be easily transported downstream through repeated actions of scouring and deposition or may become incorporated into the bottom sediment. In the bottom sediment it is either consolidated within the sediment or exposed to biochemcial processes at the interface between the sediment surface and the overlying water. In the pH range of natural waters, mercury will be rapidly oxidized, especially in that zone called the sediment water interface, to form the divalent mercury ion (Hg). The formation of the divalent mercuric ion is necessary for the biological methylation reaction to take place. From an ecological standpoint, a most serious aspect of environmental mercury problems is that certain organisms in the aquatic environment are capable of biologically synthesizing methylmercury compounds from the mercuric ion.

Not only are the methylated forms of mercury more toxic than other forms of mercury, but they are also more biologically mobile. Aquatic organisms are able to concentrate methylmercury either directly from the water or

THROUGH THE FOOD CHAIN. THUS, TWO BIOLOGICAL PROCESSES ARE INVOLVED: THE BIOLOGICAL CONVERSION OF INORGANIC MERCURY COMPOUNDS OF RELATIVELY LOW TOXICITY INTO HIGHLY TOXIC METHYLMERCURY AND THE BIOLOGICAL MAGNIFICATION OF THIS MATERIAL IN THE AQUATIC ORGANISM.

MERCURY IN GROUNDWATER

METALLIC MERCURY RELEASED TO THE GROUND SURFACE WILL MIGRATE VERTICALLY THROUGH PORE SPACES IN THE SOIL AND THROUGH OPEN FRACTURES OR CAVITIES IN THE UNDERLYING BEDROCK. IT CAN EASILY MOVE INTO THE GROUNDWATER.

TO BE TRANSPORTED LATERALLY BY GROUNDWATER, METALLIC MERCURY MUST BE CONVERTED TO A WATER-SOLUBLE COMPOUND. SUCH A CONVERSION IS POSSIBLE IN WATER HAVING A PH MUCH ABOVE OR BELOW 7.0. GROUNDWATER IN SHALE IN THE OAK RIDGE AREA, SUCH AS THAT UNDERLYING THE Y-12 PLANT AREA, IS LIKELY TO BE IN THE RANGE OF PH 6.0-7.0. IN ITS SOLUBLE FORM THE MERCURY WILL MOVE WITH THE TRANSPORTING GROUNDWATER AT VELOCITIES IN SHALE OF PROBABLY LESS THAN 10 FEET PER DAY.

GROUNDWATER SYSTEMS OF THE AREA ARE FAIRLY LOCAL AND EXTEND ONLY SEVERAL SQUARE MILES. THERE IS NO REGIONAL MOVEMENT OF GROUNDWATER.

Water entering a groundwater system as recharge from rainfall travels relatively short distances--generally less than a mile--before it is discharged to the surface again through springs or to streams. Movement of water in these systems generally follows the direction of the overlying surface drainage.

Depths of the water table in the Valley floors are shallow--nearly everywhere less than 50 feet. In the vicinity of streams the water table is at or near ground surface.

Movement of Mercury into the Food Chain

The majority of mercury wastes reaching the aquatic environment finally accumulates in the bottom sediments. Biological and chemcial processes convert much of this mercury to the reactive and toxic methyl form. The organic mercury in these sediments that is readily consumed by bottom-feeding organisms or is filtered out by planktonic animals becomes a component of the biological cycling in the ecosystem. Fish feeding on the animals containing mercury continue to pass the mercury to higher levels in the food chain. Biological accumulation of these organic mercurials in fish is of obvious importance to the role of natural food chains. The excretion rate of this mercury is generally slow in fish and many animal species. Consequently, a long-

TERM EXPOSURE MAY LEAD TO THE ACCUMULATION OF MERCURY IN PREDATORY BIRDS AND MAMMALS THAT FEED ON FISH WITH HIGH MERCURY CONCENTRATIONS.

OVERALL, FISH ARE THE MOST IMPORTANT SOURCE OF METHYL MERCURY IN FOOD FOR MAN'S USE. HOWEVER, MERCURY IN FOOD OTHER THAN FISH MAY BE AN IMPORTANT FACTOR IN THE QUANTITATIVE EVALUATION OF THE EXPOSURE OF MAN TO MERCURY IN THE OAK RIDGE AREA.

WHILE MERCURY CONCENTRATIONS GREATER THAN 10-20 PPB CAN BE TOXIC TO AQUATIC ORGANISMS, SUBLETHAL LEVELS ARE ALSO ABSORBED AND BIOLOGICALLY MAGNIFIED. THE ACCUMULATION RESULTS FROM ABSORPTION OF MERCURY BY INGESTION OR DIRECTLY FROM WATER THROUGH THE ORGANISM'S OUTER SURFACES AND/OR ACROSS GILL MEMBRANES. THE MAGNITUDE OF BIOLOGICAL ACCUMULATION IS A FUNCTION OF THE SPECIES, EXPOSURE INTERVAL, FEEDING HABITS, METABOLIC RATE, SIZE OF THE ORGANISM, AND VARIOUS WATER QUALITY CONDITIONS, AS WELL AS THE MAGNITUDE OF THE MERCURY POLLUTION.

UPTAKE OF MERCURY BY VEGETABLES

MERCURY CAN ENTER THE FOOD CHAIN THROUGH VEGETABLES AND OTHER FOOD CROPS GROWN ON MERCURY-CONTAMINATED SOILS. AGRICULTURAL SOILS USUALLY CONTAIN LOW, INCONSEQUENTIAL AMOUNTS OF MERCURY. HOWEVER, MERCURY CAN BE ADDED TO AGRICULTURAL SOILS IN THE FORM OF INDUSTRIAL AND MUNICIPAL

WASTE OR IN MERCURY-CONTAMINATED SEDIMENTS DREDGED FROM STREAMBEDS. IN A STUDY IN ENGLAND, SEDIMENT TAKEN FROM A CONTAMINATED STREAMBED WAS USED TO GROW RYEGRASS, SUGAR BEETS, AND CLOVER. THE LEVELS OF MERCURY IN THESE PLANTS WERE NOT APPRECIABLY DIFFERENT FROM LEVELS FOUND IN THE SAME CROPS GROWING ON NONCONTAMINATED SOILS. IN ANOTHER STUDY, HOWEVER, SEVERAL VEGETABLE CROPS WERE GROWN ON SOILS AMENDED WITH SEWAGE SLUDGE CONTAINING HIGH LEVELS OF MERCURY, AND THESE CROPS WERE FOUND TO CONTAIN APPRECIABLY HIGHER LEVELS OF MERCURY THAN THE SAME CROPS GROWN ON SOILS WITHOUT THE SLUDGE. IN OTHER STUDIES ON MERCURY-CONTAMINATED SOILS, THE SAME PATTERNS EMERGE--SOME SHOW ELEVATED LEVELS OF MERCURY IN CROPS WHILE OTHERS SHOW NO EFFECT. IN MOST STUDIES, HOWEVER, IT HAS BEEN FOUND THAT MUCH OF THE MERCURY TAKEN IN BY PLANT ROOTS STAY IN THE ROOT AND DOES NOT MOVE INTO THE AERIAL OR ABOVE-GROUND PLANT PARTS. IN THE ABSENCE OF DEFINITIVE ANSWERS, IT WOULD BE WISE TO REFRAIN FROM GROWING FOOD CROPS ON SEDIMENTS DREDGED FROM MERCURY-CONTAMINATED STREAMS AND ON SOILS AMENDED WITH MERCURY-CONTAMINATED SLUDGES.

Mrs. **Lloyd**. Thank you very much, Mr. Freeman. We certainly agree with you and we certainly applaud Mr. La Grone for his openness, his candor, and forthright attempts to really get to the bottom of the problem.

You mentioned in your testimony that we are not going to be looking at what could have been done.

Certainly that is not our reason for being here today, to point fingers for the sake of accusing people, but at the same time I think we have to look at the past to make sure that we do not make the same mistakes again because what was done, a positive effect should have been reached, agreement reached so that we can move forward and use the expertise and the great scientific minds that are here that you referred to.

I would also like to present to you a letter to Mr. Hart by Ralph Brooks from the R&D facility stating that they did not feel that there was need for TVA to collect additional samples in 1978, although some of the fish had more mercury than should have been allowed.

Do you think that certainly, although TVA knew about the situation, it did not understand or recognize the magnitude of the problem even though they were consulted and memoranda and letters were submitted?

[The letter follows:]

Tennessee Valley Authority,
Muscle Shoals, Ala., March 27, 1978.

Mr. R. J. Hart,
Oak Ridge Operations Office,
Oak Ridge, Tenn.

Dear Mr. Hart: We have received the February 13, 1978, letter from James K. Alexander, with its enclosed data package on mercury contamination in fish taken from the Clinch River-Popular Creek area and sediment data from East Fork and Popular Creek. Based on the rather extensive data base sent to us, we do not see the need for TVA to collect any additional samples in CY 1978, even though some of your fish data indicates guidelines of 0.5 ng/g Hg in fish flesh is exceeded.

I suggest we reappraise the situation in January of 1979 and determine the need for any additional sampling.

Please keep us on your list to receive future information.

Very truly yours,

Ralph H. Brooks, Ph.D.,
Chief,
Water Quality and Ecology Branch.

Mr. **Freeman**. Madam Chairman, we were not told that there had been over 2 million pounds of mercury leaked to the environment.

The alarming fact was withheld from us. We were asked to—on the basis of some facts that did not ring an alarm bell, when it turns out now that there were facts in the DOE operation, in their files, that would have rung the alarm bell.

We were not even given any data, I am told by the staff, at the 1977 meeting on the fish in East Poplar Creek.

But, most importantly, there were 2.4 million pounds of mercury that had escaped into the environment on the basis of the 1977 study and they were meeting with the TVA staff ostensibly to ask our help and we were not told about this.

We, therefore, had a grossly inadequate basis for making any judgment as to whether or not there was a continuing source of mercury.

I can assure you that our staff, at least in the 5¾ years since I have been there, understands that we feel a responsibility to bring such facts to the attention of the appropriate authorities.

The situation that occurred is, we were looking at a tiny piece of an alarming picture and were not given the fundamental facts that has caused this hearing and has caused the interest of the press, and yet I do not want to look backward and press that. I am just delighted that we now have got it out in the open and we can do something about it.

Mrs. LLOYD. I certainly think that during your tenure at TVA there was no adequate correspondence to address the magnitude of the problem, but I think there was a significant amount of communication between DOE and TVA in the mid-1970's.

That is the timeframe that is referred to. I have a copy of a letter, dated May 6, 1977, and I would like to submit it for the record.

It says, "All three TVA representatives were interested in elevated levels found but were not alarmed in any way. They noted that the concentrations found in Poplar Creek fish are similar to those now seen in fish in Pickwick Lake and Kentucky Lake."

So, again, my point was the magnitude of the problem addressed in the 1970's.

[The letter with attachments follows:]

UNITED STATES
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
OAK RIDGE OPERATIONS
P. O. BOX E
OAK RIDGE, TENNESSEE 37830

AREA CODE 615
TELEPHONE 483 8611

May 6, 1977

W. H. Travis, Director,
Safety & Environmental Control Division

MERCURY IN FISH IN POPLAR CREEK; MEETING WITH TVA'S DIVISION OF ENVIRONMENTAL PLANNING, CHATTANOOGA, TENNESSEE

The subject meeting was held May 4, 1977, with myself and J. K. Alexander representing ORO's Environmental Protection Branch, Mr. Harold Abee representing UCCND and Messrs. W. B. Nicholas, R. J. Ruane and Jack D. Milligan representing TVA.

The TVA personnel were provided a summary of the raw data now available for Mercury in Poplar Creek and Clinch River Fish. The summary was compiled by Mr. Abee from UCCND 1976 sampling and analysis data. This summary is attached (Enclosure 1.).

After examining the data, all three TVA representatives were interested in the elevated levels found; but were not alarmed in any way. They noted that the concentrations found in the Poplar Creek fish were similar to those now seen for fish in Pickwick Lake and Kentucky Lake. Graphs showing these levels are also attached for reference (Enclosure 2.). No restrictions for game or commercial fishing are in effect on these reservoirs at this time. TVA has an on-going program for measuring mercury-in-fish trends in all its reservoirs. More emphasis has been given to Cherokee, Chicamauga, Pickwick and Kentucky Lakes, where levels of some concern have been observed (i.e., exceeding the proposed FDA limit of 0.5 ppm in fish flesh). *

Of greatest concern to the TVA monitoring effort at this time are the levels being found in the upper reaches of the North Fork of the Holston River, specifically just below the discharges from a chlor-alkali plant in southwestern Virginia. Average concentrations in various species in these waters range from 2 to 3 ppm.

Up to this point, our discussions with TVA indicated that, taken in the proper perspective, the elevated levels of mercury found in the little-used Poplar Creek fishery do not constitute either a health hazard or a potential irreversible threat to the local environment. *

Mr. Milligan, with the Division of Environmental Planning's Special Projects Staff, expressed positive interest in TVA adding the Poplar Creek area to their other monitoring locations. Mr. Milligan is probably the single TVA employee most interested in the mercury in fish and river sediment monitoring program. He was curious about the source of mercury in the creek and seemed satisfied with our conjectures. He requested that we provide any mercury in sediment data we might have to complement the fish data provided. He also concurred with our assumption that, in the absence of any significant on-going mercury discharges from Y-12 or ORGDP, mercury in creek sediment must be the source of the mercury in the fish.

Mr. Nicholas, Chief of DEP's Water Quality Branch, indicated that before TVA could become involved in additional sampling and monitoring for mercury in fish at ORGDP, Mr. Peter Krenkal, Director of the Division of Environmental Planning, would have to consider whether this monitoring would actually fit into TVA's purposes for monitoring fish for mercury in the Valley, particularly since this monitoring program's budget is currently being cut back. Mr. Nicholas also indicated that the State of Tennessee participates in TVA's current program and if the program were expanded to measuring trends in Poplar Creek, the State would be involved. Notwithstanding several unresolved issues with the State of Tennessee, we do not believe State involvement in a formal, relatively long-term monitoring effort would create any new problems between ORO and the State.

Mr. Ruane, supervisor of the Aquatic Biology and Ecology Section, seemed interested in an agreement whereby ERDA/UCCND would collect the samples and provide them to the TVA Fisheries Lab in Norris for analysis. He indicated that the costs TVA would not incur in having to collect the extra fish samples could make it possible for TVA to include the Poplar Creek site in their analysis program at the current budget level. We remained noncommittal on supplying specimens, as the collection frequencies and sample populations that might be required could constitute too large a cost for ERDA or UCCND.

Overall, our discussions with TVA were enlightening and helpful. We are hopeful that TVA will choose to work with ERDA and UCCND and add the Poplar Creek site to their trend monitoring program. We believe this would be beneficial in that the Federal Agency in this region that is specifically recognized to have the responsibility for characterizing water quality and ecological stress conditions would, in fact, be performing that function at the mouth of Poplar Creek. TVA would also tend to illustrate the situation in Poplar Creek relative to other areas where mercury levels are above normal, and would do so for a number of years. This would be much better an approach than the publication of a set of limited data with various conclusions or hypotheses on cause and effect relationships. This type of information could reach the local public in an aberrant perspective and cause undue concern over non-existent health hazards or relatively insignificant environmental matters.

J. F. Wing, Chief
Environmental Protection Branch

OSE:JKA

Enclosures:
1. 1976 ORO Analysis
2. 1970-1975 Pickwick & Kentucky graphs

CC w/encls:
V. J. D'Amico
H. D. Hickman
H. D. Fletcher
Jim Alexander, PIO
H. H. Abee, Y-12

Attachment 1

Mercury In Fish Information
From 1976 Sampling And Analysis Program

1. 186 Fish analyzed from Clinch River
   - A. 10 fish exceeded 0.5 µg/g level
     - (1) River reach between CRM 11.5 and 12.2 (around Poplar Creek Outfall)

(a)	1 of 5 largemouth bass	max. level 0.74 µg/g	avg. 0.47
	2 of 2 buffalo	max. level 1.98 µg/g	avg. 1.88
	1 of 4 carp	max. level 0.58 µg/g	avg. 0.34
	1 of 1 longear sunfish	max. level 0.67 µg/g	--
	1 of 15 bluegill	max. level 0.56 µg/g	avg. 0.20

     - (2) River reach between CRM 10.7 and 11.5 (below Poplar Creek)

(a)	1 of 1 buffalo	max. level 0.61 µg/g	--

     - (3) River reach between CRM 12.2 and 13.6 (above Poplar Creek)

(a)	2 of 11 largemouth bass	max. level 0.62 µg/g	avg. 0.27
	1 of 1 buffalo	max. level 0.61 µg/g	--

2. 37 fish analyzed from Melton Hill Lake - all were <0.5 µg/g level.

3. 86 fish analyzed from Poplar Creek.
   - A. 27 fish exceeded 0.5 µg/g level
     - (1) Distribution of fish type >0.5 µg/g level.

8 of 8 largemouth bass	max. level 1.17 µg/g	avg. 0.73
10 of 51 bluegill	max. level 1.27 µg/g	avg. 0.37
2 of 4 crappie	max. level 0.68 µg/g	avg. 0.42
1 of 2 sauger	max. level 1.35 µg/g	avg. 0.83
3 of 6 carp	max. level 0.97 µg/g	avg. 0.48
2 of 4 buffalo	max. level 1.98 µg/g	avg. 0.83
1 of 7 sucker	max. level 0.67 µg/g	avg. 0.27
0 of 2 drum	max. level 0.38 µg/g	avg. 0.25
0 of 2 white bass	max. level 0.20 µg/g	avg. 0.19

Totals 27 of 86 fish >0.5 level

Sample Codes MH-1 Through MH-11 and MC-1 Through MC-26 --These samples were collected in Melton Hill Reservoir at Clinch River Mile (CRM) 33.3. Since these fish were collected upstream from any known anthropogenic sources of mercury, the mercury concentrations for these samples can serve as controls for comparative purposes. (Sampling area shown on Map 1)

Sample Codes PC-1 Through PC-64--These samples were collected from the mouth of Poplar Creek upstream to Blair Bridge (sample station PC-1 on Map 2).

Sample Codes PC-65 Through PC-86--These samples were collected from immediately above Blair Bridge upstream to the confluence with the East Fork of Poplar Creek (sample station PC-2 on Map 2).

Sample Codes CR-1 Through CR-48--These samples were collected in the Clinch River upstream from the confluence with Poplar Creek (sample station CR-5 on Map 2).

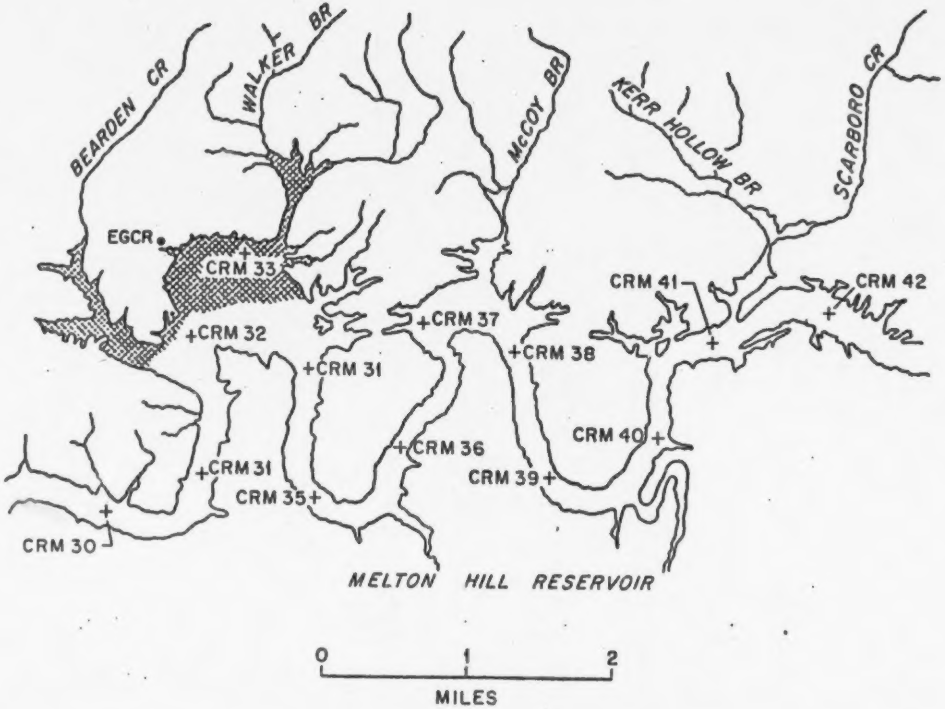
Sample Codes CR-49 Through CR-77--These samples were collected in the Clinch River at the mouth of Poplar Creek (immediately above and below the confluence, sample station CR-4 on Map 2).

Sample Codes CR-78 Through CR-112--Samples were collected downstream from the confluence of Poplar Creek, extending from approximately Clinch River Mile (CRM) 10.7 to 11.5 (sample station CR-3 on Map 2).

Sample Codes CR-113 Through CR-150--Samples were collected in the Clinch River downstream from the confluence with Poplar Creek, extending from approximately CRM 9.2 to 10.6 (sample station CR-2 on Map 2).

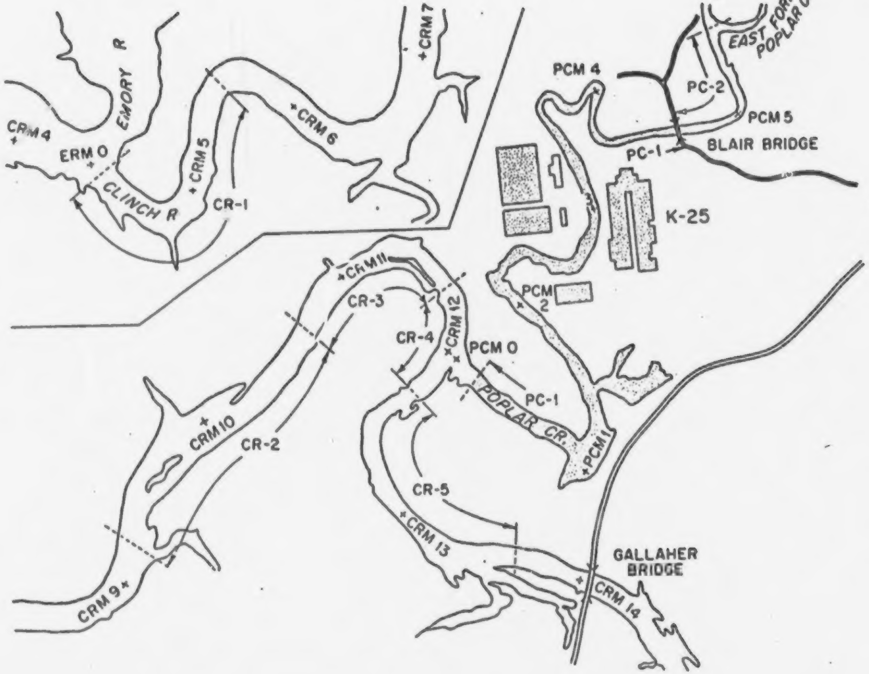
Sample Codes CR-151 Through CR-186--Samples were collected in the Clinch River from the confluence with the Emory River upstream to approximately CRM 5.5 (sample station CR-1 on Map 2).

MAP 1


BEARDEN CR
WALKER BR
McCOY BR
KERR HOLLOW BR
SCARBORO CR
EGCR
CRM 33
CRM 32
CRM 31
CRM 37
CRM 38
CRM 41
CRM 42
CRM 40
CRM 39
CRM 36
CRM 35
CRM 31
CRM 30
MELTON HILL RESERVOIR
0
1
2
MILES

NOTE: Shaded area is the sampling location of the MH and MC samples.

MAP 2


EAST FORK POPLAR CR
PC-2
PCM 5
PCM 4
PC-1
BLAIR BRIDGE
K-25
PCM 2
PCM 0
PC-1
POPLAR CR.
PCM 1
EMORY R
CRM 4
ERM 0
CLINCH R
CRM 5
CR-1
CRM 6
CRM 7
CRM 11
CR-3
CRM 12
CR-4
CRM 10
CR-2
CRM 9
CR-5
CRM 13
GALLAHER BRIDGE
CRM 14

NOTE: Sampling locations in Poplar Creek (PC-1 and PC-2) and Clinch River (CR-1, 2, 3, 4, & 5).

Sample Identification	Date Received	Mercury Content μgHg/g	Species	Length (in.)	Weight (g)
CR-1	6-16-76	0.61	Buffalo	18.7	1556
CR-2	"	0.01	Sucker	8.9	135
CR-3	"	0.15	Crappie	10.1	185
CR-4	"	0.19	Crappie	11.6	282
CR-5	"	0.05	Drum	7.6	70
CR-6	"	0.01	Sucker	10.7	229
CR-7	"	0.21	LM Bass	15.4	902
CR-8	"	0.02	Bluegill	6.1	80
CR-9	"	0.04	Bluegill	5.0	39
CR-10	"	0.11	Bluegill	2.9	9
CR-11	"	0.13	Crappie	6.0	36
CR-12	"	0.05	LM Bass	4.5	18
CR-13	"	0.20	Carp	18.1	1168
CR-14	"	0.21	Carp	15.0	681
CR-15	"	0.46	LM Bass	15.5	869
CR-16	"	0.55	LM Bass	16.1	992
CR-17	"	0.13	Sucker	14.7	536
CR-18	"	0.23	Carp	14.4	613
CR-19	"	0.16	Bluegill	6.8	96
CR-20	"	0.15	Carp	14.4	546
CR-21	"	0.19	Carp	15.5	711
CR-22	"	0.47	LM Bass	17.0	1325
CR-23	"	0.13	Sucker	14.6	582
CR-24	"	0.08	Sucker	13.4	410
CR-25	"	0.11	LM Bass	8.2	107
CR-26	"	0.13	LM Bass	10.5	290
CR-27	"	0.15	LM Bass	10.4	234
CR-28	"	0.13	LM Bass	11.2	371
CR-29	"	0.04	Crappie	5.0	24
CR-30	"	0.16	Crappie	7.2	61

NBS Bovine Liver Control #5 = 0.02 μgHg/g; value 0.02 μgHg/g

Sample Identification	Date Received	Mercury Content μgHg/g	Species	Length (in.)	Weight (g)
CR-31	6-16-76	0.06	Crappie	6.9	53
CR-32	"	0.05	Crappie	7.1	61
CR-33	"	0.04	Crappie	6.8	56
CR-34	"	0.05	Crappie	7.7	79
CR-35	"	0.05	LM Bass	5.0	26
CR-36	"	0.62	LM Bass	6.6	52
CR-37	"	0.07	Bluegill	7.1	115
CR-38	"	0.05	Bluegill	6.0	64
CR-39	"	0.06	Bluegill	5.7	52
CR-40	"	0.13	Bluegill	5.2	42
CR-41	"	0.24	Bluegill	5.5	53
CR-42	"	0.05	Bluegill	5.6	58
CR-43	"	0.05	Bluegill	4.7	36
CR-44	"	0.04	Bluegill	5.0	39
CR-45	"	0.31	Bluegill	5.6	50
CR-46	"	0.09	Bluegill	4.0	17
CR-47	"	0.14	Bluegill	6.1	68
CR-48	"	0.05	Crappie	5.5	27

Sample Identification	Date Received	Mercury Content µgHg/g	Species	Length (in.)	Weight (g)
CR-49	6-16-76	0.74 -	LM Bass	14.6	752
CR-50	"	0.41 -	LM Bass	8.4	124
CR-51	"	0.48 -	LM Bass	8.4	114
CR-52	"	0.31 -	LM Bass	4.7	18
CR-53	"	1.98	Buffalo	18.0	1492
CR-54	"	0.58	Carp	14.0	582
CR-55	"	0.29	Carp	14.6	736
CR-56	"	1.78	Buffalo	15.7	1000
CR-57	"	0.29	Carp	15.5	830
CR-58	"	0.21	Carp	16.9	1058
CR-59	"	0.21	Sucker	16.9	720
CR-60	"	0.09	Sucker	14.2	564
CR-61	"	0.46	Bluegill	6.7	114
CR-62	"	0.25	Bluegill	5.4	48
CR-63	"	0.05	Bluegill	7.3	139
CR-64	"	0.67	Longear Sunfish	8.2	136
CR-65	"	0.13	Bluegill	6.9	122
CR-66	"	0.29	Bluegill	4.3	32
CR-67	"	0.56	Bluegill	6.5	108
CR-68	"	0.08	Bluegill	5.2	58
CR-69	"	0.22	Bluegill	5.1	52
CR-70	"	0.26	Bluegill	6.4	94
CR-71	"	0.11	Bluegill	5.4	64
CR-72	"	0.10	Bluegill	5.0	50
CR-73	"	0.30	Bluegill	6.4	92
CR-74	"	0.11	Bluegill	6.3	92
CR-75	"	0.03	Bluegill	5.2	56
CR-76	"	0.08	Bluegill	5.6	62
CR-77	"	0.42	LM Bass	5.3	34
CR-78	7-14-76	0.61	Buffalo	20.1	1996
CR-79	"	0.07	Carp	14.7	638
CR-80	"	0.40	Sucker	16.0	696
CR-81	"	0.44	Sucker	13.8	459
CR-82	"	0.11	Sucker	15.2	500
CR-83	"	0.33	Sucker	15.6	746
CR-84	"	0.11	Sucker	16.1	658
CR-85	"	0.30	LM Bass	12.6	441
CR-86	"	0.28	LM Bass	12.1	462
CR-87	"	0.23	LM Bass	10.5	275
CR-88	"	0.24	LM Bass	12.2	420
CR-89	"	0.22	LM Bass	7.8	82
CR-90	"	0.19	LM Bass	4.8	16

NBS Bovine Liver Control #5 = 0.02 µgHg/g; value 0.02 µgHg/g

Sample Identification	Date Received	Mercury Content µgHg/g	Species	Length (in.)	Weight (g)
CR-91	7-14-76	0.14	LM Bass	4.5	14
CR-92	"	0.04	Bluegill	6.9	132
CR-93	"	0.21	Bluegill	7.2	120
CR-94	"	0.24	Bluegill	7.5	140
CR-95	"	0.05	Bluegill	6.9	120
CR-96	"	0.05	Bluegill	6.5	98
CR-97	"	0.28	Bluegill	7.1	118
CR-98	"	0.22	Bluegill	6.4	82
CR-99	"	0.12	Bluegill	6.1	68
CR-100	"	0.13	Bluegill	5.8	75
CR-101	"	0.09	Bluegill	5.0	44
CR-102	"	0.07	Bluegill	5.0	38
CR-103	"	0.11	Bluegill	5.6	58
CR-104	"	0.32	Bluegill	4.9	38
CR-105	"	0.10	Bluegill	5.6	64
CR-106	"	0.08	Bluegill	4.3	28
CR-107	"	0.08	Bluegill	3.6	16
CR-108	"	0.08	Bluegill	3.9	18
CR-109	"	0.08	Bluegill	4.2	26
CR-110	"	0.10	Bluegill	2.8	8
CR-111	"	0.10	Bluegill	3.1	10
CR-112	"	0.05	Shiner	3.5	5
CR-113	7-21-76	0.43	LM Bass	16.5	1004
CR-114	"	0.24	LM Bass	13.0	480
CR-115	"	0.18	LM Bass	13.1	534
CR-116	"	0.26	LM Bass	15.4	968
CR-117	"	0.21	LM Bass	11.9	392
CR-118	"	0.19	LM Bass	8.2	108
CR-119	"	0.05	LM Bass	7.2	74
CR-120	"	0.12	Sauger	15.0	450
CR-121	"	0.08	Sauger	9.8	120
CR-122	"	0.16	Buffalo	15.2	816
CR-123	"	0.41	Carp	18.6	1368
CR-124	"	0.20	Carp	16.7	916
CR-125	"	0.30	Carp	16.1	946
CR-126	"	0.15	Carp	15.7	830
CR-127	"	0.08	Buffalo	16.0	892
CR-128	"	0.16	Sucker	16.2	882
CR-129	"	0.32	Sucker	17.5	844
CR-130	"	0.22	Sucker	15.7	658
CR-131	"	0.12	Sucker	14.6	570
CR-132	"	0.04	Sucker	12.5	328
CR-133	"	0.01	LM Bass	8.2	116
CR-134	"	0.07	Pumpkinseed Sunfish	4.3	36
CR-135	"	0.22	Bluegill	7.4	122
CR-136	"	0.13	Bluegill	7.6	148
CR-137	"	0.06	Bluegill	7.3	140
CR-138	"	0.07	Bluegill	5.3	54
CR-139	"	0.07	Bluegill	5.8	68
CR-140	"	0.05	Bluegill	4.7	38

NBS Bovine Liver Control #6 = 0.02 µgHg/g; value 0.02 µgHg/g.

Sample Identification	Date Received	Mercury Content µgHg/g	Species	Length (in.)	Weight (g)
CR-141	7-21-76	0.07	Bluegill	3.7	18
CR-142	"	0.07	Bluegill	3.2	14
CR-143	"	0.06	Bluegill	4.0	22
CR-144	"	0.08	Bluegill	3.7	18
CR-145	"	0.10	Bluegill	5.0	42
CR-146	"	0.11	Bluegill	4.5	32
CR-147	"	0.05	Bluegill	3.9	22
CR-148	"	0.06	Bluegill	3.5	20
CR-149	"	0.06	Crappie	6.1	48
CR-150	"	0.03	Crappie	4.8	25
CR-151	"	0.21	Carp	17.5	1160
CR-152	"	0.09	Carp	17.0	1030
CR-153	"	0.18	Sheepshead	15.4	916
CR-154	"	0.12	LM Bass	12.5	438
CR-155	"	0.10	LM Bass	13.3	573
CR-156	"	0.24	LM Bass	14.9	815
CR-157	"	0.11	LM Bass	10.6	258
CR-158	"	0.11	LM Bass	10.6	219
CR-159	"	0.18	LM Bass	9.7	182
CR-160	"	0.13	LM Bass	7.4	90
CR-161	"	0.10	LM Bass	7.8	100
CR-162	"	0.15	LM Bass	6.7	62
CR-163	"	0.16	LM Bass	5.9	42
CR-164	"	0.07	LM Bass	5.7	42
CR-165	"	0.44	Sucker	17.0	788

NBS Bovine Liver Control #7 = 0.02 µgHg/g; value 0.02 µgHg/g.

Sample Identification	Date Received	Mercury Content µgHg/g	Species	Length (in.)	Weight (g)
CR-166	7-21-76	0.07	Sucker	16.8	702
CR-167	"	0.11	Sucker	15.9	7[illegible]0
CR-168	"	0.04	Bluegill	6.3	94
CR-169	"	0.02	Bluegill	5.7	52
CR-170	"	0.06	Bluegill	5.8	70
CR-171	"	0.04	Bluegill	5.5	58
CR-172	"	0.05	Bluegill	5.5	54
CR-173	"	0.05	Bluegill	5.3	50
CR-174	"	0.04	Bluegill	6.2	72
CR-175	"	0.03	Bluegill	6.0	56
CR-176	"	0.01	Bluegill	4.7	40
CR-177	"	0.04	Bluegill	7.0	118
CR-178	"	0.07	Bluegill	6.4	78
CR-179	"	0.03	Bluegill	5.3	50
CR-180	"	0.04	Bluegill	6.0	58
CR-181	"	0.04	Bluegill	4.5	28
CR-182	"	0.02	Bluegill	3.4	12
CR-183	"	0.06	Hybrid	8.5	68
CR-184	"	0.02	Hybrid	6.3	86
CR-185	"	0.01	Hybrid	4.6	38
CR-186	"	0.03	White Crappie	8.0	98

NBS Bovine Liver Control #8 = 0.02 µgHg/g; value 0.02 µgHg/g.

Sample Identification	Date Received	Mercury Content µgHg/g	Species	Length (in.)	Weight (g)
PC-1	5-11-76	1.17	LM Bass	8.5	150
PC-2	"	0.71	LM Bass	9.7	200
PC-3	"	0.21	Crappie	10.6	250
PC-4	"	0.60	Bluegill	7.8	60
PC-5	"	0.39	Bluegill	6.6	100
PC-6	"	0.92	Bluegill	7.3	164
PC-7	"	0.25	Bluegill	6.7	110
PC-8	"	0.77	LM Bass	6.0	34
PC-9	"	0.78	Bluegill	7.0	134
PC-10	"	0.59	LM Bass	10.8	241
PC-11	"	0.17	Bluegill	6.5	116
PC-12	"	0.18	White Bass	14.1	666
PC-13	"	0.16	Sucker	15.3	354
PC-14	"	0.74	LM Bass	4.2	18
PC-15	"	0.30	Sauger	12.0	219
PC-16	"	0.12	Bluegill	5.7	64
PC-17	"	0.11	Bluegill	5.2	50
PC-18	"	0.21	Bluegill	5.0	46
PC-19	"	0.34	Bluegill	4.8	40
PC-20	"	0.25	Bluegill	4.1	27
PC-21	"	0.28	Bluegill	4.5	35
PC-22	"	0.26	Buffalo	18.2	1210
PC-23	"	0.29	Carp	14.6	713
PC-24	"	0.51	Bluegill	7.2	138
PC-25	"	0.16	Bluegill	4.8	41
PC-26	"	1.02	Bluegill	5.6	71
PC-27	"	0.15	Bluegill	5.9	71
PC-28	"	0.45	Bluegill	7.3	142
PC-29	"	0.65	Bluegill	7.0	100
PC-30	"	0.09	Bluegill	6.3	96
PC-31	"	0.97	Carp	17.6	1173
PC-32	"	0.09	Bluegill	4.2	34
PC-33	"	0.33	Bluegill	4.5	34
PC-34	"	0.30	Bluegill	4.2	28
PC-35	"	0.19	Sucker	7.4	76
PC-36	"	0.20	Sucker	17.8	1224
PC-37	"	0.56	Carp	16.8	1076
PC-38	"	0.20	White Bass	11.5	328
PC-39	5-14-76	0.38	Drum	11.3	274
PC-40	"	0.12	Drum	7.4	63
PC-41	"	0.42	Bluegill	7.1	139
PC-42	"	0.52	Bluegill	6.2	103
PC-43	"	0.09	Bluegill	6.1	80
PC-44	"	0.41	Bluegill	3.4	15
PC-45	"	0.26	Bluegill	4.3	26
PC-46	"	0.10	Bluegill	5.4	58
PC-47	"	0.32	Bluegill	4.8	37
PC-48	"	0.26	Bluegill	2.9	9
PC-49	"	0.29	Bluegill	4.5	33
PC-50	"	0.31	Bluegill	5.2	55

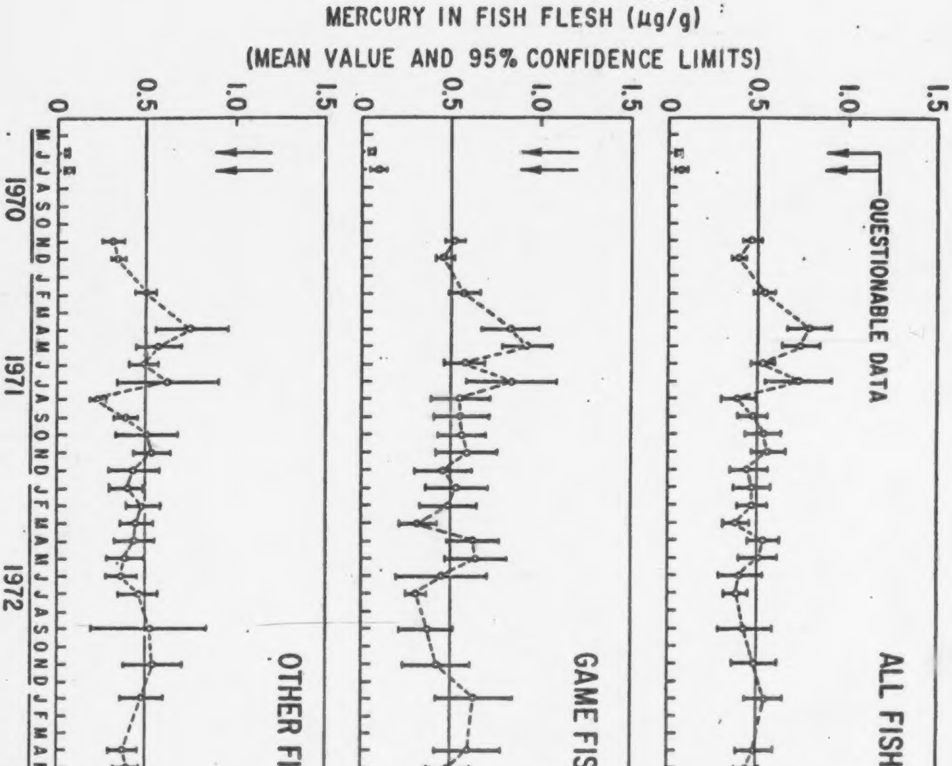
NBS Bovine Liver Control #1 = 0.02 µgHg/g; value 0.02 µgHg/g
NBS Bovine Liver Control #2 = 0.02 µgHg/g; value 0.02 µgHg/g

Sample Identification	Date Received	Mercury Content μgHg/g	Species	Length (in.)	Weight (g)
PC-51	5-14-76	0.09	Bluegill	2.3	3
PC-52	"	0.51	LM Bass	6.5	53
PC-53	"	0.69	LM Bass	4.7	18
PC-54	"	0.52	Carp	18.9	1428
PC-55	"	0.40	Carp	18.7	1758
PC-56	"	1.98	Buffalo	20.6	2824
PC-57	"	0.38	Buffalo	13.2	606
PC-58	"	1.35	Sauger	16.5	835
PC-59	"	1.27	Bluegill	8.0	194
PC-60	"	0.82	Bluegill	6.9	126
PC-61	"	0.31	Bluegill	4.7	42
PC-62	"	0.23	Bluegill	3.0	10
PC-63	"	0.68	Crappie	7.5	74
PC-64	"	0.27	Crappie	6.7	60
PC-65	"	0.67	Sucker	16.5	416
PC-66	"	0.26	Sucker	11.2	283
PC-67	"	0.69	Buffalo	15.2	1030
PC-68	"	0.16	Carp	15.5	932
PC-69	"	1.11	Bluegill	7.4	162
PC-70	"	0.37	Bluegill	5.9	80
PC-71	"	0.22	Bluegill	3.3	14
PC-72	"	0.26	Bluegill	4.8	40
PC-73	"	0.16	Sucker	9.6	76
PC-74	"	0.30	Bluegill	5.7	72
PC-75	"	0.49	Bluegill	6.3	102
PC-76	"	0.23	Bluegill	5.1	44
PC-77	"	0.20	Bluegill	4.2	28
PC-78	"	0.26	Bluegill	4.9	44
PC-79	"	0.26	Bluegill	3.4	14
PC-80	"	0.37	Bluegill	4.3	30
PC-81	"	0.27	Bluegill	4.2	28
PC-82	"	0.29	Bluegill	3.0	10
PC-83	"	0.52	Crappie	8.1	104
PC-84	"	0.65	LM Bass	4.2	16
PC-85	"	0.24	Sucker	15.2	782
PC-86	"	0.25	Buffalo	17.6	1614
MH-1	5-11-76	0.09	Carp	16.6	927
MH-2	"	0.05	Carp	15.1	717
MH-3	"	0.10	Carp	11.8	358
MH-4	"	0.20	Carp	12.8	370
MH-5	"	0.17	Carp	11.5	304
MH-6	"	0.03	Carp	12.3	409
MH-7	"	0.03	Crappie	8.1	98
MH-8	"	0.28	Gizzard Shad	11.2	165
MH-9	"	0.04	Bluegill	6.5	84
MH-10	"	0.06	Bluegill	6.3	73
MH-11	"	0.04	Bluegill	5.0	42

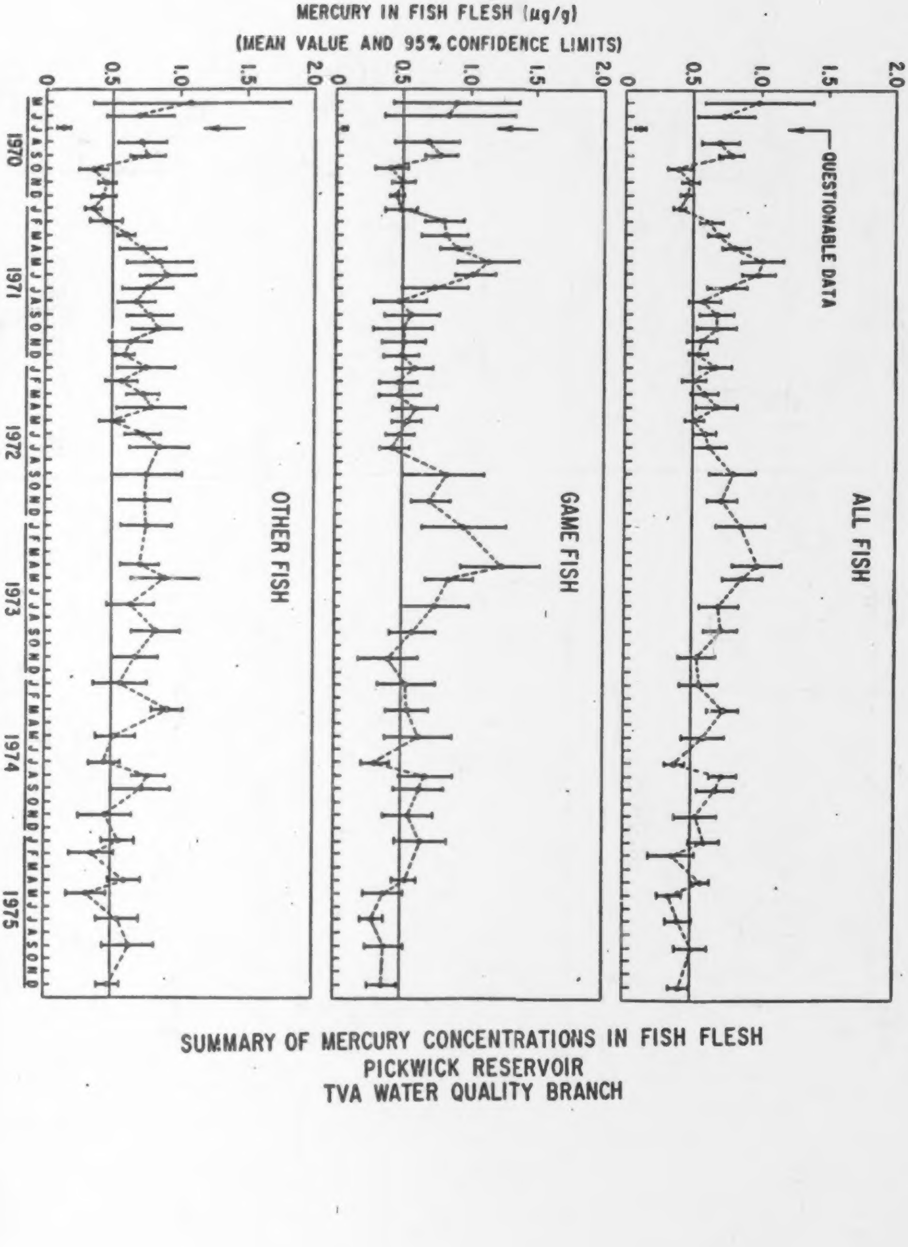
Sample Identification	Date Received	Mercury Content µgHg/g	Species	Length (in.)	Weight (g)
MC-1	10-6-76	0.01	LM Bass	6.8	61
MC-2	"	< 0.01	LM Bass	7.4	82
MC-3	"	0.04	LM Bass	6.7	56
MC-4	"	< 0.01	LM Bass	6.5	52
MC-5	"	< 0.01	LM Bass	5.7	34
MC-6	"	< 0.01	LM Bass	5.5	34
MC-7	"	< 0.01	LM Bass	6.8	70
MC-8	"	0.05	LM Bass	6.7	62
MC-9	"	0.03	LM Bass	5.6	36
MC-10	"	< 0.01	LM Bass	5.5	34
MC-11	"	< 0.01	LM Bass	4.0	14
MC-12	"	0.03	Bluegill	7.0	98
MC-13	"	0.06	Bluegill	6.4	94
MC-14	"	0.01	Bluegill	5.9	54
MC-15	"	0.02	Bluegill	5.9	53
MC-16	"	0.03	Bluegill	5.8	50
MC-17	"	0.03	Bluegill	5.3	38
MC-18	"	0.04	Bluegill	5.1	40
MC-19	"	0.02	Bluegill	5.0	36
MC-20	"	0.04	Bluegill	4.8	31
MC-21	"	0.08	Bluegill	4.7	28
MC-22	"	0.01	Bluegill	4.4	25
MC-23	"	< 0.01	Bluegill	3.8	18
MC-24	"	< 0.01	Bluegill	3.8	16
MC-25	"	< 0.01	Bluegill	3.5	14
MC-26	"	< 0.01	Bluegill	3.5	12

NBS Bovine Liver Control #9 = 0.02 µgHg/g; value = 0.02 µgHg/g.

Attachment 2



SUMMARY OF MERCURY CONCENTRATIONS IN FISH FLESH
KENTUCKY RESERVOIR
TVA WATER QUALITY BRANCH



SUMMARY OF MERCURY CONCENTRATIONS IN FISH FLESH
PICKWICK RESERVOIR
TVA WATER QUALITY BRANCH

Mr. **Freeman**. But, Madam Chairman, in all fairness, those people at that meeting—that meeting was before I came to the Board, but I have had extensive discussions with one of the gentlemen here who was there—they were not told that there was potentially a continuing source of mercury on the basis of an over 2-million pound leak. And they were not given any fish samples from the place where the data turns out to have been the highest.

You bring some people in and ask them for help but do not tell them what the basis for alarm might be, and you should not be surprised that they were not alarmed.

It seems to me that our staff acted rationally on the basis of the totally adequate information that they were given. I just cannot understand how they could have been asked to a meeting in early 1977 ostensibly to help with the problem and not told that the genesis of it was back in the 1950's and 1960's when they lost over 2 million pounds of mercury.

The more I examine that situation, the more frustrated I am that it occurred, and the less I want to talk about it.

Mrs. **Lloyd**. Do you feel that the DOE deliberately withheld information on mercury contamination?

Mr. **Freeman**. I never question people's motives. The end result is that they did not in fact tell us.

The Tennessee Valley Authority, while I was Chairman of the Board, issued two reports. One was entitled "Where the Water Isn't Clean Anymore" and the other "Where the Water is Getting Cleaner."

We did not have the facts about this mercury situation and while we pointed the finger at many other situations, we did not here, and I can tell you for sure that it was not because we were bashful about publicizing the facts. We did not have them.

Mrs. **Lloyd**. Thank you.

Mr. Gore?

Mr. **Gore**. The letter that Mr. Wing referred to—read me that last sentence, the one that he read. It says——

Mr. **Freeman**. Mr. Brooks, who wrote the letter, is right here.

Mr. **Gore**. You read it, Mr. Brooks. I know you realize the sentence I am referring to.

Mr. **Brooks**. Well, the next to the last sentence is "I suggest we reappraise the situation in January of 1979 and determine the need for any additional sampling."

Mr. **Gore**. Was that done?

Mr. **Brooks**. That was not done because there was no more data supplied beyond that additional data set that was a reaction to them in this letter. In other words, we never heard from DOE again about this matter.

Mr. **Gore**. And you did not contact them back?

Mr. **Brooks**. No, we did not. As we explained in the letter, we thought they had a lot of data and we reviewed it all, and our reaction to that data, as it would be today, is that a mercury contamination problem did not exist in that area.

Mr. **Gore**. So your view is that they were the lead—they had the lead role and you did not hear back from them, so——

Mr. **Brooks**. Well, the decision was not guided by that, although we may have thought that.

The reason that we—we have staff and did have them looking fairly widely at all the problems and they had provided us quite a bit of data which did now show alarming levels of mercury contamination.

With no more data forthcoming, we thought that our reaction stood and that the numbers still must remain lower than what we were finding elsewhere in the valley.

Mr. GORE. Now, if you had had—I mean, I understand what you are saying, Mr. Freeman, that the single most alarming fact was the high volume of mercury discharged, that was withheld from TVA. Other facts were given to TVA related to soil samples, plant samples, fish samples. Correct, Mr. Brooks?

Mr. BROOKS. Limited data, yes.

Mr. GORE. What else was withheld, in your view?

Mr. BROOKS. Data from East Fork Poplar Creek, for one. We have people that are looking at the new data that has been shipped to TVA and the State under the memorandum of understanding, and that is quite a large volume of data.

We did not have any of that—we did not have but a very small portion of that data which preceded this original memo.

Mr. GORE. I see, but initially that was not provided?

Mr. BROOKS. No. As a matter of fact, we only in the last few months received the minutes of that meeting and we did find in the report of that meeting that there was a discussion of the fact that we in our technical staff making decisions could assume no continuing sources of mercury.

So that added to our faith that with no more sampling data coming on for review and being told that in the discussions we could consider no active sources of mercury, we did not need to keep looking there.

Mr. GORE. I see. I will be glad to yield.

Mrs. LLOYD. I have a letter to Mr. Milligan that says the sediment data for East Fork for 1977 was submitted to TVA. Would you care to comment on that?

Mr. BROOKS. Yes. We had the sediment data from East Fork Poplar Creek as we had in the remainder of the drainage.

There were some words in that transmittal, as has been discussed before, that would indicate that we should not be looking too carefully at East Fork Poplar Creek and so we looked downstream from there.

Now, Jack Milligan looked at the data itself at that time, but, again, I think it would be fair to say that if someone asked today should we ask for more data from DOE, the answer would be yes. And the data we would ask for—we were provided data in fish samples in the remainder of the drainage but not East Fork Poplar Creek. We would have said, "Give us some fish samples from East Fork Poplar Creek."

We can only assume that their environmental program was sufficient to look where the sources are most likely to be.

As a matter of fact, in the discussion in the 1977 meeting, we asked where is this mercury most likely coming from and the source—East Fork Poplar Creek was not mentioned, to our recollection.

Mrs. LLOYD. Thank you.

Mr. **Gore**. It is also my understanding, and correct me if I am wrong, that you were provided averages and not ranges of data from the East Fork sediment.

Mr. **Brooks**. That is right. The early meeting, again for those there, was quite an informal affair and the data was shown to the participants. There was not a great deal of organization to how the information was laid out and quite frankly I think some of that data was provided by mail, but it was piecemeal. I guess that is the best way to describe it.

Mr. **Gore**. Well, I understand what TVA's position is here. You are saying that the data you were provided constituted part and not the major part of the jigsaw puzzle, as all environmental problems are.

You have to fit together a lot of the disparate data points and figure out what threat there is, but you did not have the center of the puzzle which was the single most alarming fact, the 2.4 million pounds, which you are saying would have led TVA to react differently had you known that.

Would you have acted differently had you known that 2.4 million pounds had been released?

Mr. **Freeman**. There is no doubt in my mind that we would have blown the whistle on the situation and made public statements along the lines that we are making now.

That is the source of my frustration because there is no doubt in anyone's mind of the attitude and policies of TVA's Board about releasing such information to the public and it is frustrating that we did not have what might be called "the smoking gun."

Mr. **Gore**. Yes. Well, without objection, Madam Chairman, I would like to put into the record a memorandum from the DOE environmental assessment division to the Oak Ridge manager dated February 9, 1977, which discourages DOE headquarters from requiring an environmental impact statement because of "the probable need to drag TVA into the ORGDP EIS" and "the awkward situation of having to discuss mercury in fish at ORGDP when the mercury may have come from Y-12."

I think that belongs in the record.

Mrs. **Lloyd**. Without objection, that will be part of the record.

[The information follows:]

Environmental Protection Branch - Weekly Activity Report - February 9, 1977

More EISs to Do

Last May 19 ORO sent HQ the last segment of the detailed Environmental Assessment of ERDA's operations in Oak Ridge. To forestall HQ from telling us to tear off the cover and call it an EIS, we advised them it was not considered to be even near EIS quality and that it would require an estimated $2.5 million and two years to do it right. For the past four months or so various HQ elements have been wrestling with a memo telling ORO to do an EIS for the X-10 site and ORGDP. Although we have heard HQ wants only an assessment for Y-12, it is understood the memo is silent on that point. HQ's rationale for requiring an EIS for X-10 is the rad waste management "problems"; for ORGDP the GC's staff thinks, due to the controversy over PORT power (Save the Valley), we must do one for ORGDP. Although Voigt resisted, he finally gave in. As of Feb. 3, 1977, the memo was waiting for Liverman's signature with no identification . funding.

HQ has been informally advised of the several problems associated with this decision:

1. the probable need to drag TVA into the ORGDP EIS,
2. the awkward situation of having to discuss mercury in fish at ORGDP when the mercury may have come from Y-12 (fish at Poplar Creek at K-25. 31% exceeded FDA proposed [illegible] .5 ppm [illegible] ppm 100% [illegible] large [illegible] have exceeded this standard.)
3. doing an EIS for only 2 of the 3 major facilities,
4. the obvious need to prepare an EIS for PAD if one is done for the other two GDPs,
5. no funding or technical staff availability for ORNL's EIS, and
6. although most of the $900K Voigt gave us for assessments on PAD, PORT, and the FMPC can be used to get PAD and ORGDP's EISs well started, we'll need about $500K in FY 1978 to finish them. (Wing)

Assistance to the Army

A member of the Environmental Protection Branch served on the Army's Technical Evaluation Committee as part of the process to select a decommissioning study contractor for Weldon Spring. Follow-up discussions with 2-3 contractors may be needed before final selection. (Hibbitts)

Portsmouth Site DEIS

The subject environmental statement was sent to the Council on Environmental Quality, February 8. Public issuance is expected about February 18. The public hearing has been rescheduled for Cincinnati, April 5, at the Netherland Hilton Hotel. ORO will likely be asked to be represented by members of management, operations, environmental protection, and public information. (Hibbitts)

Portsmouth NPDES Permit; Revisions for Add-on Construction

A fairly comprehensive plan for periodic revision and updating of Portsmouth's NPDES permit, to be consistent with add-on construction and operation, has been completed and hopefully can be approved by ERDA and submitted to EPA soon. Several modifications of standards effective July 1, 1977, are needed. (Alexander)

Oak Ridge Gas Centrifuge Plant DEIS

A meeting was held February 8 with representatives of Carbide Engineering, ORGDP, and ORNL to discuss updating the subject report. The work will be phased with Engineering and ORO providing revisions by March 8, and ORNL updating the environmental impact section between March 8 and March 25. The report will be ready for the editor and retyping about April 1. ORNL is making an estimate of funding needs; Carbide engineering expects to absorb their portion of the cost of the updating. (Hibbitts)

Site Selection for LMFBR Hot Pilot Plant

Three Branch members participated in a meeting at ORNL to discuss site selection for the LMFBR Hot Pilot Plant. The preferred site is adjacent to a unique natural area and near a second one. Although the site itself is probably environmentally acceptable, construction of support facilities and utilities must be carefully planned to ensure protection of these areas. This should be considered in making the final site selection. (Martin/Wing/Hibbitts)

Leave/Travel

Same as previously reported.

Mr. GORE. Now, you mentioned a Federal commitment, Mr. Freeman, to provide the resources necessary to make certain that this problem is solved.

I just wanted to underscore my agreement with that. It is really mandatory.

The impact of the Federal facility at Oak Ridge on the community at Oak Ridge has always been taken into account by the Congress.

You have the enormous amount of land taken out of the tax base in this area; you have the need of the community to provide all kinds of services, schools and all kinds of services to the families of employees here and Congress has always attempted to quantify that impact on the community.

Here we have another impact on the community that is the responsibility of the Federal Government, and the Federal Government has a responsibility to the citizens of Oak Ridge and the community of Oak Ridge, to make them whole and to make the community whole by making absolutely certain that whatever actions are necessary to solve this problem are forthcoming, and I just wanted to associate myself with your suggestion in that regard.

My colleague and I have discussed this at some length and I know that she has already taken steps in that regard and I am going to assist her in making certain that there is adequate follow-through on the part of the Federal Government.

That is all the questions I have.

Mrs. LLOYD. I thank you for being with us and participating in the hearing this afternoon. We perhaps will be submitting additional questions to you, Mr. Freeman, as well.

We will break for lunch now and resume our hearings at 12:30. The committee is recessed.

[Whereupon, at 11:57 a.m., the subcommittee was recessed, to reconvene at 12:30 p.m. the same day.]

AFTERNOON SESSION

Mr. GORE. The hearing will come back to order. We are going to have witnesses appear in panels for the remainder of the day, and we have three panels for the rest of the day. I would like—well, before calling the first afternoon panel, I would like to recognize my cochairman.

Mrs. LLOYD. Thank you very much, Mr. Gore.

I would like to insert in the record the comments of Robert Peelle, who is a member of the Roane County legislative body. I think it brings up the comment that we have made that in discussing Oak Ridge, we are not referring to the city of Oak Ridge but we are referring to the Anderson County-Roane County area which does make up our Oak Ridge consideration. We certainly are equally impacted by the mercury spill as well.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Peelle follows:]

THE NEEDS FOR FEDERAL EFFORTS TO MITIGATE ILL EFFECTS OF THE Y-12 MERCURY RELEASES

Robert Peelle, member
Roane County Legislative Body

July, 1983

First, I want to thank the members of Congress for their concern expressed by taking time for this meeting. Federal action will be required, and your support can speed that action to completion.

I believe that the large quantities of mercury in the old releases on the federal reservation are damaging Roane County, the county into which streams drain from this area. This damage may involve present or potential health hazards, or may consist only of the fears of future hazards that may develop as mercury may move through the environment. The prospects for economic self sufficiency of our governmental units now appears to be damaged by the initial publicity suggesting an unbounded possible hazard. There is anecdotal evidence that the credibility of our R & D work is tarnished by association. The federal agencies with your encouragement should determine and broadly publicize the facts, and than take action to eliminate any ill effects of these old releases. These efforts, already begun, need to be continued to completion.

The investigation should aim to obtain the informed estimates of the most qualified experts on the present extent, distribution, and chemical form of the released material, and the likely future course of its impact on the safety and livability of our city and county. This work will have to include examination of present and future pathways to man as the material may migrate.

The publicity needs to be current with the findings and needs to be understandable to both experts and common citizens. Communication with the public will require meaningful comparisons to more familiar hazards. The publicity should reach individuals known to be involved, local governments, and the public via the press and libraries. We need the facts, since fears of the unknown are more distressing than coping with any likely reality. Because of the long time since releases terminated, I believe that public information should not be restricted by security classification.

The action should include at least cleanup, purchase and setaside of contaminated lands, long term monitoring programs, and forthcoming compensation of citizens damaged in health or in long term value of their property. The goal of both the publicity and action phases should be to remove from members of the public any health, psychic, or monetary costs of the releases. The full scope and amount of action can not be decided until more information is in hand.

I am not sure whether the recommended federal efforts would best be organized by the DOE alone or by an interagency task group. This decision depends on the balance between needs for efficiency and for breadth of outlook.

It is unimportant to our citizens to know which persons or organizational units allowed the present situation to develop. However, there should be a broad agency review to check whether releases of any other materials from the plant areas might be of future concern to citizens of this area. If so, steps should also be taken to investigate, publicize, and act to mitigate the impacts of any such releases.

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Mr. GORE. Well, I would like to add to that, a representative from the Kingston community spoke with me during the break and expressed concern about the water intake at Kingston. We checked and established that that water intake is in fact upstream on the Tennessee from the point of confluence with the Clinch, and in fact is not threatened by the activities that are under investigation here, and I would be glad to elaborate on this if that gentleman wants to pursue it later on. But we are interested in the entire area and all of the communities and counties concerned here.

I would like to call the members of the first panel up to the witness table. Dr. Chester R. Richmond, associate director for Biomedical and Environmental Sciences and Dr. Stanley I. Auerbach, director, Environmental Sciences Division with Union Carbide at the Oak Ridge National Laboratory. I think a couple of witnesses are a little tardy in coming back from lunch. Maybe they are all here.

Dr. Nathaniel Revis from the Oak Ridge Research Institute, we are delighted to have you with us. Dr. Frank M. D'Itri from the Institute of Water Research at Michigan State University and Dr. Charles Coutant from the city of Oak Ridge Environmental Quality Advisory Board. Gentlemen, if you would all make your way to the witness table and if you would stand and be sworn, please. Is Dr. Auerbach——

Dr. RICHMOND. He is coming. He will be just a moment.

Mr. GORE. Well, perhaps we will wait and when he gets here, we will go through that procedure.

Dr. Richmond, you and Dr. Auerbach are sharing a statement, is that correct?

Dr. RICHMOND. That is correct.

Mr. GORE. All right. Why don't we swear the witnesses at this point. If you would all stand and raise your right hand.

[Witnesses sworn.]

Mr. GORE. Dr. Richmond, we will begin with you. Without objection, the entire text of all statements from this panel will be included in full in the record, and if you can summarize portions of your statement where it will not do any damage to it to summarize, we will appreciate that, and we are going to hold off on questions until each member of the panel has completed his statement.

Dr. Richmond, we are going to begin with you.

STATEMENTS OF DR. CHESTER R. RICHMOND, ASSOCIATE DIRECTOR FOR BIOMEDICAL AND ENVIRONMENTAL SCIENCES AND STANLEY I. AUERBACH, DIRECTOR, ENVIRONMENTAL SCIENCES DIVISION, UNION CARBIDE CORP., OAK RIDGE NATIONAL LABORATORY

Dr. RICHMOND. Thank you. I would like to mention at the outset that I brought a poster along to show some of the significant dates and standards and points related to the process. There are a great many things involved and I thought it might help the panel as well as the people at your table.

Concern for mercury toxicity was very much on the minds of both AEC and Y-12 managers and industrial hygienists as they prepared in 1953 and 1954 for COLEX operations. This classified process involved thousands of shift workers and programs were instituted before cascades went into operation to cope with the then recognized hazards of breathing mercury vapors. These precautions were taken because the engineers anticipated frequent maintenance and troubles during startup of these new processes involving pumping huge quantities of mercury under pressure.

The urinalysis program was started in 1953 and was expanded to provide a check on the worker mercury exposures. When urinary mercury values for an individual remained at a high level for several specimens, the personnel were assigned to other work areas, then returned when their urinalysis mercury levels dropped to normal range.

In addition to the air sampling and urinalysis programs, there was a routine medical surveillance program with clinical examinations for all mercury workers every 6 months. Persons with a history of albuminuria, kidney problems, or hypertension were screened out and not allowed to work with mercury.

Toward the middle of 1955, management recognized the urgency of reducing high mercury vapor levels, and a crash program was undertaken to bring the levels down. The net effect of these administrative efforts is documented by the historical record of mercury concentrations which shows that the air levels were dramatically reduced and under control by March 1956 and stayed under control during the next 7 years of operation.

In 1974, a consultant from the National Institute of Occupational Safety and Health reviewed the Y-12 data on mercury worker exposure. He selected 50 of the original workers who had received high exposures and asked the Y-12 medical staff to examine them according to a protocol that he furnished. None of the 23 employees still on the payroll showed any symptoms of mercury poisoning.

More recently, in 1983, Oak Ridge Associated Universities, in conjunction with the University of North Carolina, conducted a preliminary epidemiological study of the mortality of the Y-12 mercury worker population. The purpose was to determine whether there is any evidence to suggest that the death rates due to cancer or any other causes are higher for the employees who worked in the Y-12 mercury exposure area than for other Y-12 employees. No such evidence was found.

Similarly, no difference was found between the Y-12 mercury workers and other Y-12 workers in the death rates due to cancer, diseases of the central nervous system organs, respiratory diseases or chronic nephritis.

Losses of mercury from the COLEX process at Y-12 between 1955 and 1963 to the East Fork Poplar Creek are for the most part traceable to a mercury purification step. In 1958, a process modification significantly reduced the mercury losses. I have highlighted that in red on the upper part of the illustration. Mercury was present as a soluble or as a finely divided suspension of mercuric chloride.

During COLEX operations, concern was focused on the quantities of mercury lost to the creek, concentrations of mercury measured and reported quarterly starting in 1954.

It is important to realize that environmental and public health standards were not developed until the 1970's. There were no metallic mercury standards prior to 1943. No standards exist for urinary excretion.

Prior to 1967, no one realized that inorganic mercury could be biologically converted to organic methylmercury. The attention that focused on the methylmercury problem in 1970 was responsible for initiating widespread studies of mercury concentrations in fish as well as sediments, river water, et cetera, throughout the entire United States. The first Y-12 study of mercury concentrations in the East Fork Poplar Creek fish was done in 1970.

The current discharges to the East Fork Poplar Creek are monitored by taking samples of the outflow of New Hope Pond. Over a 24-month period from 1981 through 1982, the overall average concentration was 1.3 parts per billion versus the interim drinking water standard of 2 parts per billion set by EPA in 1975. Over these 2 years, 64 pounds of mercury, about 2 liters, was released. This is an average of about 1.4 ounces per day. In the last few months, as was indicated earlier by Mr. La Grone and others, there has been an active program to identify the sources and form of mercury contamination and to clean up the residual sources.

Y-12 has undertaken efforts to study subsurface movements and determine whether mercury accumulations can be located below sites of spills or operational facilities. A further objective is to find out whether there is any significant contamination of ground water from those past losses.

Mercury is ubiquitous. We are constantly taking mercury into our bodies through the daily consumption of food and liquids. Several studies suggest intakes of about 3 to 4 micrograms per day. A recent sampling of fish from a local supermarket indicated mercury levels in fish coming into the area that ranged up to 1 microgram of mercury per day.

The level of mercury that accumulates in human tissues depends on many factors, including the amount taken in and the biological half-life, which is the time required for the mercury concentration to drop by one-half, provided no additional mercury is taken into the body. Data suggest an average biological half-life of about 70 days. Thus, following a single intake, methylmercury would be absorbed from the gut and distributed to various body tissues. Half of the mercury would be lost from the body in about 70 days and only about 1.5 percent would remain after 420 days.

However, for repeated intakes, an equilibrium level is reached between intake to and loss from the body. For mercury, the equilibrium body level is about 100 times the daily intake.

To estimate the concentration of mercury that will be reached in the tissues of humans, the amounts of organisms, aquatic organisms, consumed and the frequency these organisms are consumed must be known. Several earlier witnesses indicated that the major area of interest for humans is that of fish and aquatic organisms.

From studies of contaminated people and biochemical studies, it was concluded that the lowest blood level of mercury that would bring about signs and symptoms of methylmercury poisoning was about 200 parts per billion. The body burden in that case would be approximately 30,000 micrograms of mercury. To obtain this equilibrium level requires a minimum daily intake of approximately 300 micrograms of methylmercury.

In setting standards for large populations, it is usual to apply a safey factor, usually 10. Thus the allowable level would be 20 parts per billion of mercury in blood or a body burden of 3,000 micrograms. The corresponding intake required to reach this level in the blood or body would be 30 micrograms of mercury every day.

The highest mean concentrations of mercury in fish from the East Fork Poplar Creek collected near the Y-12 plant entrance was 2.13 microgram per gram of fresh weight. An individual would need to consume one-half ounce of these fish everyday from this location before his blood mercury level would reach the allowable level of 20 parts per billion. It would take about a year for the body burden to essentially reach equilibrium. During that time, about 11 pounds would need to be ingested by that individual.

The mercury concentrations in fish tend to decrease with distance from Y-12. Therefore, larger quantities of fish would need to be ingested before the allowable body burden of mercury was reached. If the average concentration in fish was 0.2 microgram of mercury per gram, an individual would have to consume over 100 pounds of these fish in 1 year to reach the allowable body burden.

It should also be remembered that the allowable level of 20 parts per billion of mercury in blood has a built in safety factor of 10, therefore, a larger quantity of the organisms could be consumed daily before the allowable level in the body was reached. And again, that is the level at which the first symptoms of methylmercury poisoning might appear.

It is doubtful that a large number of organisms could be harvested on a regular basis from the East Fork Poplar Creek, especially the quantity required to provide food on a daily basis.

In summary, we feel that the release and subsequent widespread distribution of mercury in Poplar Creek drainage basin and the Clinch River do not constitute an acute risk to human health or the environment. We cannot arrive at the same conclusion regarding the long-term treat without more information. In all probability there is not a long-term threat as well.

Thank you.

Mr. GORE. Thank you very much.

Dr. Auerbach, do you have anything you wish to add to that?

Dr. AUERBACH. Yes, sir. In my remarks I want to review the history of the monitoring and environmental studies of mercury in the Oak Ridge environs that have been carried out by the Union Carbide Corp. Nuclear Division.

Each of the three Oak Ridge facilities operated by the Nuclear Division has a specific unit whose responsibility is to develop appropriate procedures and carry out surveillance activities in the environs. These units are called Departments of Environmental Management and are components of larger health and safety organizations. At the Nuclear Division level, there is an Office of Health, Safety, and Environmental Affairs under the direction of the senior management officer. This office makes the overall environmental protection activities for the three facilities.

The Environmental Sciences Division of Oak Ridge National Laboratory has been involved with the mercury problem but it does not have any responsibilities or authority to initiate or carry out environmental surveillance activities. Its mission is research. Because of the experience and expertise, it is frequently called upon for advice or assistance in matters related to environmental impacts of residuals. Such has been the case with mercury where the division has been responsive to requests for its expertise since the early 1970's.

Environmental research groups and environmental surveillance groups frequently will differ in their perception of what constitutes an environmental problem. Environmental surveillance groups generally operate from fixed guidelines or standards. Given these standards, plus generally limited resources to carry out their responsibilities, these groups often have to make judgments based on limited data.

On the other hand, environmental scientists behave in an entirely different mode. As scientists they are trained to question, to examine, to be skeptical and to try and relate effects to cause. In addition, environmental scientists, based on well developed scientific precepts, are aware of the technical weaknesses of limited sampling, particularly when broad judgments are expected to be made regarding a particular environmental situation.

Consequently, when faced with a pollution situation of broad magnitude, they will call for detailed studies and investigation. While these differences in viewpoint were manifested in our work on the mercury problem, both groups agreed at that time and to the present, that there was no imminent threat to the public health.

It is important to recall that public concern over mercury pollution did not begin until the late 1960's as part of a general national interest in environmental problems. Reflecting this concern, the

Y-12 plant in 1970 conducted the first survey for mercury in fish, water, and sediments within the Oak Ridge area. The results were encouraging in that average concentrations, while elevated, were not sufficient cause for alarm. In fact, fish purchased in the local market had body concentrations equal to or greater than some of those caught from the creek. Nevertheless, the presence in fish resulted in the establishment of a program for systematic sampling of mercury in fish and sediments.

In the 1970's, Oak Ridge National Laboratory units, including the environmental sciences division, began research on mercury contamination. As ESD scientists gained expertise in this field, they began to take a scientifically critical view of local monitoring activities, especially when it was becoming evident that environmental impact statements would have to be prepared for the Oak Ridge facilities. With several years experience in preparing such statements, the environmental sciences division staff believed that much more detailed information would be needed than that derived from routine monitoring.

In early 1974, the environmental sciences division was requested to a short term aquatic surveillance program as part of a more general preparation for a multifacilities impact assessment. The survey was initiated in 1974 and completed in 1975.

Mr. GORE. Excuse me, if I may interrupt, who requested that?

Dr. AUERBACH. That had to come to us from the Oak Ridge Operations Office.

Mr. GORE. Thank you.

Dr. AUERBACH. The results indicated that more data would be needed for a formal impact statement and recommendations were made thereto. These recommendations were transmitted through channels to the Nuclear Division and in December 1975, the President of the Nuclear Division sent to the Manager of the Oak Ridge operations a comprehensive sampling plan to provide for preparation of an environmental statement.

Beginning in 1976, more detailed fish sampling was undertaken as part of the monitoring program. The results, while showing elevated levels of mercury, were on average below the FDA action levels. These findings were discussed in the 1977 environmental monitoring report, the Y/UB report, which was given to the media and to the State.

Also in 1976, the Oak Ridge Operations Office initiated further surveys in the Poplar Creek area. The environmental sciences divison was requested to do a survey of fish in the vicinity of K-25. This report has come to be known as the 1977 Elwood report. About this time, Department of Energy, ORO representatives met with TVA staff to request TVA's assistance in assessing data on fish in Poplar Creek and the Clinch River.

According to correspondence, TVA first agreed to do a sampling survey; then after reviewing the data they had received, they indicated there was no further need to collect more data in 1978.

From 1976 on, there has been an almost continuous effort to evaluate aspects of the local mercury problem. Monitoring was carried out by UCC-ND's surveillance units with the same general results found earlier. The environmental sciences division expressed a need for more detailed monitoring. Oak Ridge operations responded by authorizing ESD to carry out a detailed survey starting in 1977, in the vicinity of K-25, and provide data for an environmental assessment document.

A year later, Oak Ridge operations authorized ESD to begin a similar study for Oak Ridge National Laboratory. Battelle Memorial Institute was authorized in 1979 or 1980, I am not sure which, to prepare an environmental assessment analysis at Y-12.

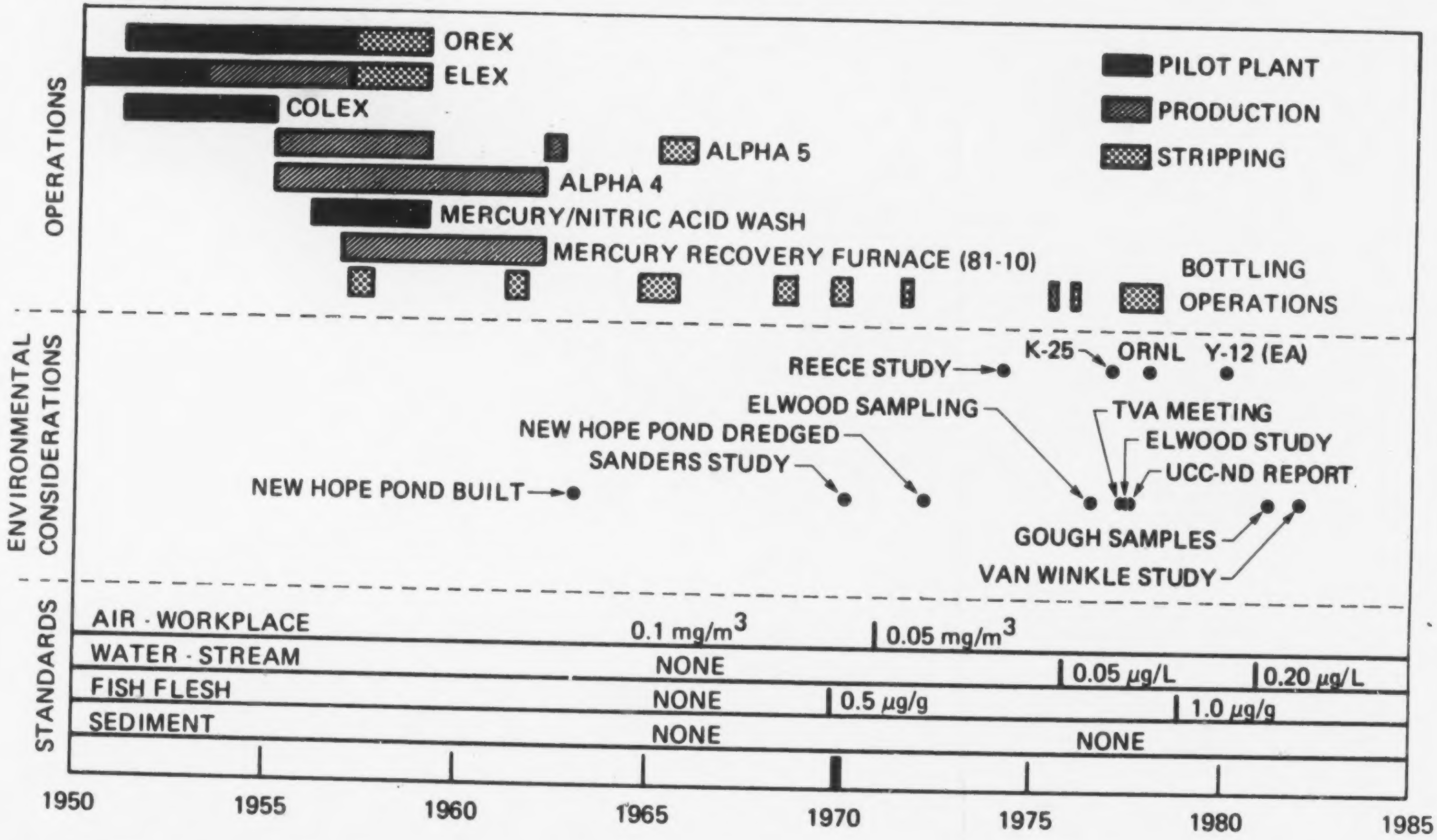
Starting, as indicated by Dr. Richmond, in the late 1950's the Y-12 plant has been involved in a process of cleaning—locating and cleaning and trying to remove mercury from the spill. These activities, which are still underway, include surveying by the environmental sciences division staff on the distribution of mercury in the Oak Ridge environs and participating in the detailed geological/hydrological studies to locate mercury in the geological strata beneath the Y-12 plant.

In summary then, for a period of almost 13 years there has been a continuous effort to try and assess the environmental and health significance of the mercury spill at Oak Ridge. While there has been differences of opinion regarding approaches to be taken to assess the problem, the scientists and the environmental protection staff are and have been in agreement that the mercury contamination did not, and does not constitute an acute health risk. We are less certain about the longer term implications of the contamination and for this reason, we have suggested a detailed and comprehensive analysis of mercury contamination in the Oak Ridge environs be undertaken as soon as feasible.

Thank you.

[Chronology chart, plus the prepared statements of Drs. Richmond and Auerbach follow:]

CHRONOLOGY


OPERATIONS
OREX
ELEX
COLEX
ALPHA 5
ALPHA 4
MERCURY/NITRIC ACID WASH
MERCURY RECOVERY FURNACE (81-10)
BOTTLING OPERATIONS
PILOT PLANT
PRODUCTION
STRIPPING
ENVIRONMENTAL CONSIDERATIONS
REECE STUDY
K-25
ORNL
Y-12 (EA)
ELWOOD SAMPLING
TVA MEETING
NEW HOPE POND DREDGED
ELWOOD STUDY
SANDERS STUDY
UCC-ND REPORT
NEW HOPE POND BUILT
GOUGH SAMPLES
VAN WINKLE STUDY
STANDARDS
AIR - WORKPLACE
0.1 mg/m3
0.05 mg/m3
WATER - STREAM
NONE
0.05 µg/L
0.20 µg/L
FISH FLESH
NONE
0.5 µg/g
1.0 µg/g
SEDIMENT
NONE
NONE
1950
1955
1960
1965
1970
1975
1980
1985

TESTIMONY AT A JOINT HEARING
OF
THE SUBCOMMITTEE ON ENERGY RESEARCH AND PRODUCTION
AND
THE SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT
OF THE
U. S. HOUSE SCIENCE AND TECHNOLOGY COMMITTEE
ON
THE IMPACT OF MERCURY RELEASES AT THE OAK RIDGE COMPLEX

SUMMARY OF ACTIONS AND ACTIVITIES RELATED TO MERCURY RELEASES IN THE OAK RIDGE AREA FROM DOE/UCC-ND OPERATED FACILITIES

C. R. Richmond
S. I. Auerbach

AMERICAN MUSEUM OF SCIENCE AND ENERGY
OAK RIDGE, TENNESSEE

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TABLE OF CONTENTS

Page

A. REVIEW OF THE USE OF MERCURY AT Y-12 1

B. ESTIMATED HEALTH RISK TO PEOPLE AS A RESULT OF CONSUMING AQUATIC ORGANISMS FROM EAST FORK POPLAR CREEK. 10

C. ENVIRONMENTAL PROTECTION 14

Mercury Studies Conducted by the Environmental Sciences Division at Oak Ridge National Laboratory 15

D. ENVIRONMENTAL SURVEILLANCE, MONITORING, AND REPORTING 19

Early Activities (Y-12, ORGDP) 19

Aquatic Monitoring Program for Environmental Assessment (Y-12, ORNL, CARL, and ORGDP Facilities) 1974-1975 21

1977 UCC-ND Monitoring Activities 25

1977 Environmental Sciences Division Report on Mercury Contamination in Poplar Creek and the Clinch River 26

Interactions with TVA 27

ESD Concerns over Monitoring of Aquatic Environments at DOE-Oak Ridge Facilities 28

Ecological Studies for the Environmental Analyses of ORGDP and ORNL Facilities 29

Activities in 1982 and 1983 30

Study to Determine Mercury Concentrations in East Fork Poplar Creek and Bear Creek in 1982 30

Mercury Concentrations in Fish in the Vicinity of ORGDP in 1982 31

Survey of Drainage at Y-12 31

Mercury Concentrations in Hair and Other Tissues from Cows and Horses 32

Literature Survey of Population Density Data for Selected Species of Sport Fish in Streams, Reservoirs, and Lakes 32

Page

E. NEED FOR ADDITIONAL STUDIES AND MONITORING OF MERCURY IN THE VICINITY OF THE DEPARTMENT OF ENERGY FACILITIES IN OAK RIDGE 33

F. REFERENCES 36

APPENDIX 1. Organization Charts for DOE/ORO, UCC-ND, ORNL, Y-12, & ORGDP, Highlighting those Organizational Units with Responsibility for Environmental Affairs

APPENDIX 2. Correspondence Relating to the Aquatic Monitoring Program for Environmental Analyses of the Y-12, ORNL, CARL, and ORGDP Facilities (1974-1975)

APPENDIX 3. Abstract, Introduction, Recommendations, and Distribution List from J. W. Elwood, "Mercury Contamination in Poplar Creek and the Clinch River," June 6, 1977

APPENDIX 4. Memoranda Relating to the Elwood (1977) Report

APPENDIX 5. Material Relating to the Ecological Studies for the Environmental analyses of the ORGDP and ORNL Facilities

APPENDIX 6. Minutes of Meeting to Determine Mercury Concentration in Area Streams

APPENDIX 7. Mercury Contamination in New Hope Pond, East Fork Poplar Creek, and Bear Creek (Briefing for Y-12 Plant Management, June 2, 1982, W. Van Winkle)

APPENDIX 8. Abstract, Introduction, Conclusions, Recommendations, and Distribution List from W. Van Winkle et al., "Mercury Contamination in East Fork Poplar Creek and Bear Creek," September 7, 1982

APPENDIX 9. Memoranda Relating to the May 1982 Survey Done by the Environmental Sciences Division for ORGDP on Mercury Levels in the Fish in Poplar Creek

APPENDIX 10. Detailed Task Plan for Further Mercury Investigations at Y-12

APPENDIX 11. Comments on Draft Report on Mercury Contamination in East Fork Poplar Creek and Bear Creek

APPENDIX 12. Literature Survey of Population Density Data for Selected Species of Sport Fish in Streams, Reservoirs, and Lakes

A. REVIEW OF THE USE OF MERCURY AT Y-12

The first buildings of the Y-12 Plant were constructed along East Fork Poplar Creek in 1943 to carry out the first production-scale separation of uranium isotopes for the atomic bomb. Ten years later, in 1953, Y-12 was called upon to undertake the first production-scale separation of the isotopes of lithium for use in hydrogen bombs. Y-12's task at this time was made urgent by the USSR hydrogen bomb test in the fall of that same year. Like the World War II uranium efforts, the lithium process effort required a crash construction program and the overcoming of major technical difficulties. But these efforts also were a success, and the cascades were started up in 1955 after a remarkable 15-month construction period. They were stopped in 1963, having produced this essential strategic material needed for the national defense.

The process that made this challenging program a success is called "COLEX," the name being a contraction of "column-exchange." It is a chemical exchange process in which lithium isotopes are separated as they transfer between two chemical phases. One of these phases is an aqueous solution of lithium hydroxide and the other phase is a solution of lithium in mercury, a lithium amalgam. Many millions of pounds of mercury were essential to the project. Directives signed by President Eisenhower made the mercury available from the National Stockpile. It was this mercury used for the "COLEX" process from 1955 to 1963 that is the source of today's concerns and the subject of these hearings.

Concern for mercury toxicity was very much on the minds of both Atomic Energy Commission (AEC) and Y-12 managers and industrial hygienists as they prepared in 1953 and 1954 for "COLEX" operations. The process was to involve thousands of shift workers, and programs were instituted before the cascades went into operation to cope with the recognized hazards of breathing mercury vapor. The building floors were modified so that the floor drains emptied into special mercury collection tanks in the basement. Here mercury could be separated from mop water and other solutions before passing to other water-collecting sumps inside and then outside the buildings before going to the creek.

These precautions were taken because it was recognized that Y-12 was pioneering an entirely new process using pumps and other equipment that had never before been utilized for this particular application. The engineers anticipated frequent maintenance and troubles during start-up of these new processes involving pumping huge quantities of mercury under pressure. The first year of production, 1955, was indeed a troublesome one. Many problems developed with the equipment. Pumps and valves needed to be serviced often. The process equipment was full of mercury, and spillage of small quantities in maintenance operations was expected and encountered. It was accommodated by special drip pans, collection containers, and administrative procedures. The mercury concentration in the workplace air was monitored frequently. (In 1956, 280,000 air samples were measured.) In the 1955 cascade start-up, higher concentrations of mercury in workplace air were encountered than acceptable. Toward the end of 1955, for instance, many of the readings were in excess of the American Conference of Government Industrial Hygiene (ACGIH) recommended value of 0.1 mg/m^3. A urinalysis program had been started in 1953 and was expanded to provide a check on the worker mercury exposures. During the time that high concentrations of mercury in air were encountered in 1955, the urinalysis data also showed higher readings, although the averages for all workers never exceeded the recommended urinalysis mercury limit of 0.3 mg/L. Still, some individual workers had readings that did exceed the 0.3 mg/L level. When urinary mercury values for an individual remained at a high level for several specimens, the personnel (approximately 70 people) were assigned to other work areas, then returned when their urinalysis mercury levels dropped to the normal range.

In addition to the air sampling and urinalysis programs, there was a routine medical surveillance program with clinical examinations for all mercury workers every six months. Persons with a history of albuminuria, kidney problems, or hypertension were screened out and not allowed to work with mercury.

Toward the middle of 1955, AEC and Y-12 management recognized the urgency of reducing high mercury vapor levels, and a crash program was undertaken to bring the levels down. The program involved technical studies of substances that could reduce vapor pressure or that could dissolve tiny mercury droplets. Engineering changes to reduce process losses were involved, including a renovation of the buildings' ventilation systems with the installation of huge fans in the end walls to provide more fresh air to the buildings. Other changes included major new housekeeping programs and the installation of a special house-vacuum system for mercury pickup. The net effect of these and other administrative efforts is documented by the historical record of air concentrations, which shows that the air levels were dramatically reduced and under control by March 1956 and stayed under control during the next seven years of operation.

In 1974 a consultant from the National Institute for Occupational Safety and Health (NIOSH), Dr. Z. Bell, reviewed the Y-12 data on mercury worker exposure. He selected 50 of the original workers who had received high exposures (based on urinalysis) and asked the Y-12 medical staff to examine them according to a protocol that he furnished. None of the 23 employees still on the payroll showed any symptoms of mercury poisoning.

More recently, in 1983, Oak Ridge Associated Universities (ORAU) conducted a preliminary epidemiological study of the mortality of the Y-12 mercury worker population by comparing this group (1477) to the other Y-12 workers (4920), then comparing both groups to the U.S. population as a whole. The purpose was to determine whether there is any evidence to suggest that the death rates due to cancer or any other causes are higher for the employees who worked in the Y-12 mercury exposure areas than for other Y-12 employees. No such evidence was found. Death rates for mercury workers as a group were 93% of the rates for the U.S. population group to which they were compared, while the death rates for the other Y-12 nonmercury workers were 90% of the rates for the U.S. population. The statistical confidence intervals for each overlapped considerably, and no significant difference was found. Similarly, no difference was found between the Y-12 mercury workers and the other Y-12 workers in the death rates due to cancers, diseases of the central nervous system organs, respiratory diseases, or chronic nephritis.

Losses of mercury from the "COLEX" process at Y-12 between 1955 and 1963 can be classified as loss to air, water, and land. Losses to water (i.e., East Fork Poplar Creek) are for the most part traceable to a process waste stream. The operation responsible for generating this waste was a mercury purification step in the operation of the "COLEX" process but was successfully modified in 1958 and the modification significantly reduced mercury losses. Mercury was discharged to the creek from this source in the form of a dilute, neutralized acid waste. The appearance of this waste stream carrying mercury to the creek was that of an almost clear solution. The mercury was present as a soluble or as a very finely divided suspension of mercuric oxide.

In 1963 and 1964 New Hope Pond was built to permit mixing and thus to even out the varying pH in the effluent from the Y-12 Plant. An unanticipated secondary benefit was the retention of substantial quantities of mercury-containing sediment. The mercury in these sediments came from secondary sources of mercury, not from the "COLEX" process waste stream which was finally stopped in 1963. The secondary sources are contamination of building drain systems, sewers, and lines connecting the process buildings to the creek headwaters or ditch. These lines contain mercury in some of the joints and contaminated sludges, etc., which continue to serve as a source of small amounts of mercury.

During "COLEX" operations, concern was focused on quantities of mercury lost to the creek, with concentrations of mercury measured and reported quarterly starting in 1954. Stream flows and thus total quantities of mercury were measured and reported beginning in the last quarter of 1955.

The possibility that mercury releases might constitute a much more serious problem than posed by what was believed to be relatively nontoxic, inorganic mercury was first publicized in the news media in

March 1970 by a Canadian scientist, Norwald Fimreite, who had linked high concentrations of mercury in fish to biological conversion of inorganic mercury to methylmercury.

Significant incidents involving mercury contamination of people were those at Minamata (1953) and Niigata (1965) in Japan. Prior to the 1950s, mercury contamination often was related to the use of medicinals and usually cosmetics containing mercury compounds. However, I read recently that in 1700 a citizen of Fiwale, Italy, sought an injunction against a factory manufacturing mercuric chloride because of its lethal fumes.

Other incidents of mercury poisoning occurred between 1956 and 1972 involving thousands of people in Iraq, Pakistan, Guatemala, Yugoslavia, and Sweden. Often, these incidents were related to the ingestion of grain seeds treated with mercurial fungicides. In 1967, the Swedish Medical Board banned the sale of fish containing high concentrations of methylmercury from about 40 lakes and rivers.

In the early 1970s, restrictions on fishing and sale of fish were imposed in many areas of the USA and Canada, and both countries began to control releases of mercury-containing wastes into lakes and streams (Goldwater, 1971). By September 1970, an ORNL study showed 18 states where some restrictions were in effect. Prior to 1967, no one realized that inorganic mercury could be biologically converted to organic methylmercury.

It is important to realize that environmental and public health standards were not developed until the 1970s as shown in the Table 1. There were no metallic mercury standards prior to 1943. In the early 1970s (see Table 2), the value for mercury in air was decreased by a factor of two. No standard exists for urinary excretion. Y-12 has used the administrative guideline of 0.3 mg/L as a plant action value.

The attention that focused on the methylmercury problem in 1970 was responsible for initiating widespread studies of mercury concentrations in fish as well as sediments, river water, etc., throughout the United States. The first Y-12 study of mercury concentrations in East Fork Poplar Creek fish was done in 1970 and

Table 1. Environmental and public health standards and criteria for mercury

	Standard in 1950	Current standards and date effected		
		Units	(ppm)	Date
Air - Workplace (ACGIH)	0.1 mg/m^3 (1946)	mg/m^3	0.05 mg/m^3	1971
Water - Drinking (EPA)	None	mg/L	0.002	1975
Water - Stream (EPA)	None	mg/L	0.00005	1976
Effluent discharges (TN)	None	mg/L	0.05	1977
Fish flesh (FDA)[a]	None	µg/g	1.0	1979
Solid waste burial, EP Test (EPA)	None	mg/L	0.2	1980
Sediment	None	None	None	

[a] Not a formal regulation. An FDA administrative action level.

Table 2. Chronology of mercury standards

Year	Organization	Guideline/standard Air (mg/m^3)	 Urine (mg/L)
1943	American National Standards Institute (ANSI)	0.1	
1946	American Conference of Government Industrial Hygiene (ACGIH)	0.1	
1952	Y-12 Plant	0.1	0.3
1957	University of Rochester recommendations	0.1	0.3
1971	American National Standards Institute (ANSI)	0.1	
1971	American Conference of Government Industrial Hygiene (ACGIH)	0.05	
1972	American National Standards Institute (ANSI)	0.05	
1973	National Institute for Occupational Health (NIOSH)	0.05	
1973	Y-12 Plant	0.05	0.3

showed the range of 0.32 ppm to a high of 1.30 ppm (memorandum from Sanders to McLendon, dated August 1970, Appendix 4). An ORNL study in that same year surveyed fish from all over the United States and showed that mercury concentrations in fish from Pickwick Lake range to 2.1 ppm and in fish from the Holston River range to 4.4 ppm.

Current Assessment

The current situation on discharges to East Fork Poplar Creek is monitored by taking samples of the outflow of New Hope Pond. "Grab" samples are taken every Monday morning, and a "composite" sample is taken on a flow-proportional basis that represents the best estimate of the mercury discharged. Over the 24-month period from 1981 through 1982, the overall average concentration was 1.3 ppb versus the interim drinking water standard of 2.0 ppb set by the Environmental Protection Agency (EPA) in 1975. The maximum value was 7.0 ppb. Taking flows into account, this means that over these two years 64 lb of mercury was released, an average of 1.4 oz/day or 39 g/day. Almost all is suspended or insoluble mercury. Material balance studies have been done in the last year to find out where this mercury originates. Each pipe feeding water into the creek headwaters or the ditch that flows into New Hope Pond was sampled and its flow measured. The effluent pipes from Buildings 9204-4 and 9201-5 contributed 47%, the pipes from 9201-4 and 81-10 contributed 44%, and the pipes from 9201-2 contributed 8% of the mercury entering New Hope Pond during the two days studied in December 1982. Of the total amount entering New Hope Pond on those days, 100 g were retained in the pond and 42 g were released to the creek.

In the last few months there has been an active program to identify the sources and form of mercury contamination and to clean up the sources: the Building 81-10 salvage area; the sumps in Buildings 9201-4, 9201-5, and 9201-2; drain lines; and storm sewers. This cleanup activity has stirred up sediments in pipes and lines, which has resulted in creek concentrations that are temporarily higher than the levels of 1981-1982. It is expected that when these operations are complete the mercury levels in the creek will drop below the 1981-1982 levels.

In addition, Y-12 will undertake subsurface studies to determine whether mercury accumulations can be located below sites of spills or operational facilities. A further objective is to find out whether there is any significant contamination of groundwater from those past losses. Further studies under way include a study of the Chestnut Ridge sediment disposal site to see whether it is contaminating groundwater. In addition, a variety of specific efforts are under way in support of work being done by others: the University of Rochester, Battelle-Columbus, Department of Energy (DOE)-ORO, etc.

B. ESTIMATED HEALTH RISK TO PEOPLE AS A RESULT OF CONSUMING AQUATIC ORGANISMS FROM EAST FORK POPLAR CREEK

The ultimate question related to a mercury-contaminated environment is the risk to human health. We will attempt to estimate the degree of risk associated with consuming aquatic organisms from the East Fork Poplar Creek. To do this, one must estimate the level that mercury would reach in the tissues of man from consuming these organisms. It should be pointed out that mercury is ubiquitous. Everyone's tissues contain mercury and we are constantly taking mercury into our bodies through the daily consumption of food and liquids. There is information, although scarce, on the "normal" intake of mercury by people. Several studies suggest intakes of about 3 to 4 μg per day (see Gerstner and Huff, 1977). The U.S. Food and Drug Administration systematically samples and surveys market products. In 1973, the FDA survey indicated an average dietary intake of 2.89 μg of mercury per day. Most of this was from fish (Food Chemical News: August 4, 1975). Mercury concentrations in some fish and shellfish sometimes exceed 0.5 μg/g tissue.

The level of mercury that accumulates in human tissues depends on many factors, including the amount taken in and the biological half-life in man. The biological half-life is the time required for the mercury concentration in man to drop by one-half, providing no additional mercury is taken into the body. The biological half-life reported for methylmercury in man is 76±3 days (World Health Organization, 1976). Other data suggest an average biological half-life value of about 70 days, with a larger amount of variability from person to person. Thus, following a single intake, methylmercury would be absorbed from the gut and distributed to various body tissues. Half of the mercury would be lost from the body in about 70 days and only about 1.5% would remain after 420 days.

However, for repeated intakes, an equilibrium level is reached between intake to and loss from the body. For mercury, the equilibrium body level is about 100 times the daily intake. For small daily intakes the equilibrium level will be small, whereas larger equilibrium levels will result from larger daily intakes. In either case, the equilibrium level in the body, sometimes called the body burden, will be about 100 times the daily intake.

Methylmercury is the chemical form of mercury that is most toxic to man. The source of methylmercury in the environment may be inorganic mercury that has been methylated in water by bacteria. Usually from 80 to 95% of the total mercury in aquatic organisms is reported to be methylmercury. Fish incorporate the methylmercury into their tissues from the water. The methylmercury is relatively nontoxic to the fish because of their simpler nervous system as compared with humans. The biological half-life in fish is usually longer than that in man. For the purpose of this evaluation, we assumed that all of the mercury in fish and aquatic organisms from East Fork Poplar Creek is methylmercury. When fish or aquatic organisms are eaten by man, practically all of the methylmercury from these foods is absorbed from the gastrointestinal tract.

To estimate the concentration of mercury that will be reached in the tissues of humans, the amount of these organisms that is consumed and the frequency with which these organisms are consumed must be known. The consumption rate of fish and other aquatic organisms in the United States varies greatly. The average per capita consumption of fish in the United States was estimated to be in excess of 20 g/day (0.7 oz/day) or about 16 lb/year; however, 1% of the population may consume 77 g/day (2.7 oz/day) (Stroud, 1977).

From Swedish studies of Japanese individuals contaminated in the episode of Niigata and from biochemical studies in Finland and Sweden (Federal Register, 1979), it was concluded that the lowest blood level of mercury that would bring about signs and symptoms of methylmercury poisoning was 200 parts per billion (ppb) (0.2 ppm). The body burden would be approximately 30,000 µg (30 mg) of mercury. To obtain this equilibrium level requires a minimum daily intake of approximately 300 µg of methylmercury. In setting standards for large populations it is usual to apply a safety factor. The safety factor usually is 10.

Thus, the "allowable" level would be 20 ppb of methylmercury in blood or a body burden of 3000 µg (3 mg) of mercury. The corresponding intake required to reach this blood (or body) equilibrium level would be 30 µg of mercury every day.

The highest mean concentrations of mercury in aquatic organisms from the East Fork Poplar Creek were collected between New Hope Pond and the Bear Creek Road bridge at the entrance to the Y-12 Plant area. The mean concentration of total mercury from seven bluegill collected in this area was 2.13 µg/g fresh weight (Van Winkle et al., 1982). An individual would have to consume 14.1 g (0.5 oz) of these fish every day from this location before his blood mercury level would reach the "allowable" level of 20 ppb. It would take about one year for the body burden to essentially reach equilibrium. During that time, 11 lbs would need to be ingested by that individual.

The mean concentration of mercury in the muscle tissue of frog legs and crayfish tails collected near this same station was 0.60 and 2.50 µg/g fresh weight, respectively (Blaylock et al., 1983). Thus, an individual consuming either 50 g/day (1.8 oz/day) of frog legs or 12 g/day (0.4 oz/day) of crayfish tails for about one year would accumulate the "allowable" body burden of mercury.

The mercury concentrations in fish tend to decrease with distance from Y-12. Therefore, larger quantities of fish would need to be ingested before the "allowable" body burden of mercury was reached. If, for example, the average concentration in fish was 0.2 µg Hg/g, an individual would have to consume 107 lb of these fish in one year to reach "allowable" body burden.

A sample of only one turtle was collected on the East Fork Poplar Creek some distance below where the other samples were collected. The concentration of mercury in the turtle was 0.46 µg/g fresh weight. Thus, an individual would have to consume 65.2 g/day (2.3 oz/day) of this turtle for about one year to reach the "allowable" body burden of mercury.

It should be remembered that the allowable level of 20 ppb of mercury in the blood has a safety factor of 10; therefore, a much larger quantity of the organisms could be consumed daily before reaching the "allowable" level in the body, a level at which the first symptoms of methylmercury poisoning may appear.

Another point that should be made is the size of the populations of aquatic organisms that inhabit the East Fork Poplar Creek. Fish populations in this stream have not been estimated using quantitative methods, but the populations do not appear to be very large. It is doubtful that a large number of organisms could be harvested on a regular basis from the East Fork Poplar Creek, especially the quantity required to provide food on a daily basis.

In summary, we feel that the release and subsequent widespread distribution of mercury in the Poplar Creek drainage basin and the Clinch River do not constitute an acute risk to human health or the environment. We cannot arrive at the same conclusion regarding the longer-term or chronic threat that the release might pose without more information on the locations and amounts of mercury in the aforementioned aquatic systems and on the extent of accumulation of mercury in human food chain organisms over extended periods of time.

C. ENVIRONMENTAL PROTECTION

The management of hazardous materials, their use, storage, surveillance, and disposal in a manner that ensures minimum impact on the environment is a line responsibility in each of the three Oak Ridge installations operated by the Nuclear Division. Each installation has in place an organizational unit to develop appropriate procedures and surveillance to ensure that the objective of the minimal environmental impact is achieved. At the Oak Ridge National Laboratory (ORNL) this unit is the Environmental Management Department of the Industrial Safety and Applied Health Physics Division. At the Oak Ridge Gaseous Diffusion Plant (ORGDP) and the Oak Ridge Y-12 Plant (Y-12), the environmental management departments are units of the Health, Safety, and Environmental Affairs divisions of the respective plant organizations.

At the Nuclear Division level, an office of Health, Safety, and Environmental Affairs, under the general direction of the ORNL Associate Director for Biomedical and Environmental Sciences, has the responsibility to initiate and/or coordinate installation environmental protection and monitoring programs consistent with the requirements of the Department of Energy (DOE) and to compile and issue annual reports of the monitoring programs. The organization charts in Appendix 1 provide more specific details.

The ORNL Environmental Sciences Division, a mission-oriented research and development unit of ORNL, has as its principal objectives (1) to conduct research leading to the development of pertinent environmental information about existing and emerging energy technologies, and (2) to utilize this knowledge in a way that is consistent with acceptable environmental protection concepts to prevent and solve problems arising during the development and implementation of these technologies. Within and without ORNL, the division's research provides and substantiates the environmental data, as well as the understanding of the environmental mechanisms, that are utilized by other organizations that have responsibility for evaluating or assessing health and safety impacts. The division's focus is on environmental matters, not human health or the related health science disciplines.

One example of this emphasis is the role the division has played, and continues to play, in studying mercury contamination on the Department of Energy (DOE) Oak Ridge Reservation and environs. While the Environmental Sciences Division has no direct authority to initiate environmental surveillance activities, it has been continuously responsive to requests to provide technical expertise on the mercury issue. As our testimony will indicate, the Environmental Sciences Division has recommended in reports and memoranda within the Nuclear Division/DOE organization that additional studies and monitoring are necessary to document the nature and extent of the mercury contamination problem in a scientifically credible and professionally responsible manner. Through our research on the DOE Oak Ridge Reservation, on the Holston River-Cherokee Reservoir in Virginia and Tennessee (Hildebrand et al., 1980a), and at the world's largest mercury mine in Almadén, Spain (Hildebrand et al., 1980b), the Environmental Sciences Division has developed an outstanding research group of geochemists, aquatic ecologists, and terrestrial ecologists publishing on various aspects of mercury contamination in the environment.

Mercury Studies Conducted by the Environmental Sciences Division at Oak Ridge National Laboratory

The purpose of the following discussion is to document that the Environmental Sciences Division at Oak Ridge National Laboratory has been involved in mercury studies for many years. Staff members of the Environmental Sciences Division were involved in mercury studies as early as 1970 (ORNL, 1971). The division has cooperated and jointly conducted research on mercury in the environment with federal agencies and authorities, state governments, and foreign countries. A large number of reports and open literature publications have resulted from these studies. A selected few will be used to document the division's involvement in mercury studies.

In the early studies funded under a research grant from the National Science Foundation, the investigators utilized the division's expertise in the cycling of radionuclides in the environment to conduct tracer studies with ^{203}Hg. The purpose of these investigations was to determine the cycling and concentration of mercury in the environment. For example, studies were conducted on: (1) the cycling of mercury in an old-field ecosystem to determine the uptake, concentration, and movement of mercury in plants and soil (Matti et al., 1975); (2) the accumulation and transfer of methylmercury in aquatic food chains (Blaylock et al., 1973; Huckabee et al., 1975, 1979); (3) the movement and distribution of inorganic and methylmercury in small streams (Huckabee and Blaylock, 1973); and (4) model development and validation of the behavior of methylmercury in a freshwater pond (Huckabee and Goldstein, 1975).

Early studies included measurement of mercury in the local east Tennessee environment. The use of mosses as indicators of airborne mercury pollution (Huckabee, 1973; Huckabee and Janzen, 1975) and the establishment of background levels of methylmercury in fish from the Great Smoky Mountains National Park (Huckabee et al., 1974) were two of the earlier studies.

As a result of our demonstrated expertise in environmental mercury research, investigators from the Environmental Sciences Division became involved with the state of Virginia, the state of Tennessee, and the Tennessee Valley Authority in establishing the mercury inputs to the Holston River-Cherokee Reservoir system from the chloralkali plant located in Saltville, Virginia (Hildebrand et al., 1980a). Several publications resulted from this study and include: "Behavior and Transport of Mercury in a River-Reservoir System Downstream of an Inactive Chloride Plant" (Turner and Lindberg, 1978), "Distribution and Bioaccumulation of Mercury in Biotic and Abiotic Compartments of a Contaminated River-Reservoir System" (Hildebrand et al., 1976), and "Mercury Accumulation in Fish and Invertebrates of the North Fork Holston River, Virginia and Tennessee" (Hildebrand et al., 1980c).

More recent studies conducted by the Environmental Sciences Division have focused on atmospheric mercury releases to the environment. These studies include atmospheric releases from contaminated soils (Lindberg et al., 1979), from chlorine production solid waste deposits (Lindberg and Turner, 1977), and from power plants (Lindberg, 1980).

Mercury studies by members of the Environmental Sciences Division were not limited to the United States. The Environmental Sciences Division was involved through the U.S. Department of State in an ecological study of the distribution of mercury in the environment in the vicinity of mercury mines in Almadén, Spain (Hildebrand et al., 1980b). The Almadén mining operations have generated the oldest and possibly the most extensive case of mercury effluents in the world. The study, which was initiated in 1974 and completed in 1977, was conducted in both terrestrial and aquatic systems with the objective of defining the range of mercury concentrations in ecosystem compartments and determining the distribution of mercury in these compartments with distance from the mining area. The research was funded by the National Science Foundation Office of International Programs, in accordance with agreements for scientific collaboration between the United States and Spain. The study was a joint effort with Spanish investigators at the mining operations, the Environmental Protection Agency (EPA), and the Environmental Sciences Division at ORNL. Staff members from the Environmental Sciences Division spent several months in Almadén while directing, conducting, and coordinating the research. Mercury analyses were conducted in Spain and at ORNL. Expertise from the Analytical Chemistry Division at ORNL was also provided to help establish procedures for mercury analyses in Spain. Several publications (Hildebrand et al., 1980b; and Huckabee et al., 1983; Lindberg et al., 1979) which resulted from this study enhanced the reputation of the Environmental Sciences Division as a recognized center of expertise for mercury pollution research.

Additional studies on mercury and other trace contaminants that reinforce the Environmental Sciences Division's activities in pollution studies have not been included in this brief summary. Our aim is to establish for the record that the Environmental Sciences Division has been involved in mercury research, especially that dealing with its behavior in freshwater environments, including uptake and accumulation by fish and other aquatic organisms, for many years.

D. ENVIRONMENTAL SURVEILLANCE, MONITORING, AND REPORTING

Monitoring of radioactive and chemical effluents, both gaseous and liquid, is conducted at each of the Oak Ridge installations. Starting in 1971, data from ORGDP, ORNL, and Y-12 have been compiled in an annual Environmental Monitoring Report for the Oak Ridge facilities. The measured effluents are compared to applicable standards and are intended to inform the reader of the effectiveness of the pollution control program at each of the Oak Ridge facilities. The report is distributed to EPA, Tennessee State Health Department, Oak Ridge Department of Public Health, and local news media.

EARLY ACTIVITIES (Y-12, ORGDP)

Mercury concentrations in the Y-12 effluents to the East Fork of Poplar Creek were measured at the Y-12 Plant starting in 1954, and quarterly averages have been recorded since that time. It is to be noted (Fig. 1) that the mercury concentrations were significantly higher during the period 1955-1959 than at any other time and that the majority of the mercury was discharged to East Fork Poplar Creek during the period mid-1956 to 1959. Our current estimate of the discharge over the years is now about one-half of what we estimated it to be in 1977 (239,000 vs 470,000 lb).

In 1970, Merwyn Sanders, the Y-12 Environmental Coordinator, initiated a survey to determine the mercury content in fish, water, and sediment samples from various parts of the Oak Ridge area. These results were reported to J. D. McLendon in an internal memorandum dated August 6, 1970 (see Appendix 4).

Following is a summarization of the findings of this survey:

- Twenty-one fish were caught from New Hope Pond, East Fork Poplar Creek, and Bear Creek.

- Ten of the fish exceeded the U.S. Public Health Service 1970 limit of 0.5 ppm.

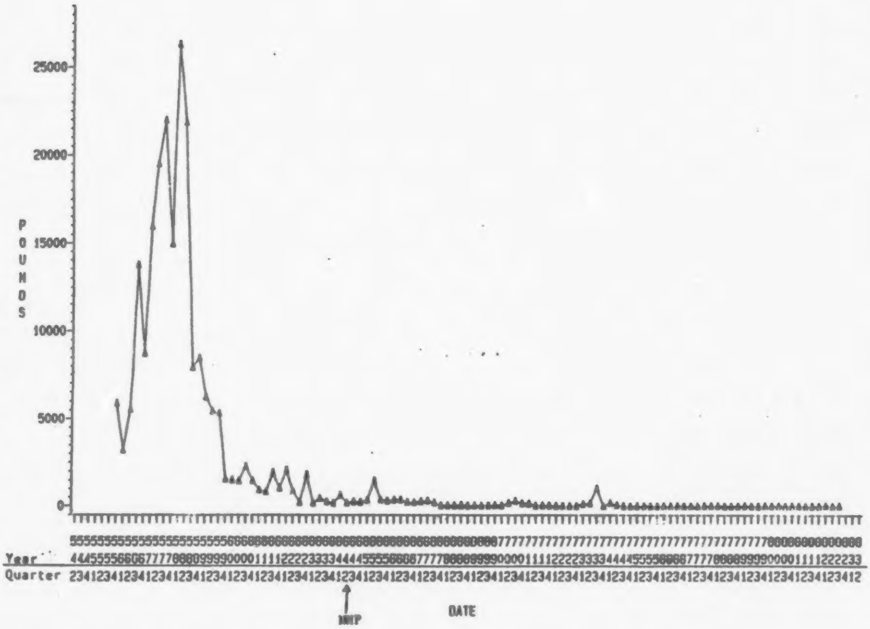

Fig. 1. Mercury losses to East Fork Poplar Creek, fourth quarter 1955 through third quarter 1982.

- Five fish were purchased at an Oak Ridge market and two from the Y-12 cafeteria, levels ranged from 0.03 to 0.67 ppm, average was 0.203 ppm.
- The average concentration of the twenty-one fish was 0.48 ppm and the highest was 1.3 ppm.
- Twelve water samples were taken in New Hope Pond, East Fork Poplar Creek, Bear Creek, and Melton Hill Lake. A maximum concentration of 0.0005 ppm was reported.
- Ten mud samples were taken in New Hope Pond, East Fork Poplar Creek, Bear Creek, and Melton Hill. A maximum concentration of 63 ppm was reported.

Data from the measurement of mercury in the effluent from New Hope Pond have been included in the annual Environmental Monitoring Report of the Oak Ridge facilities since the report was first issued in 1971. Table 3 provides a compilation of the data taken from these reports for the years 1971-1982.

A sediment sampling program was initiated by ORGDP in 1975 to determine the concentrations of various metals in Poplar Creek. Samples are collected twice annually and analyzed for various metals, one of which is mercury. These data have been included in the annual Environmental Monitoring Report since that time (see Table 4).

AQUATIC MONITORING PROGRAM FOR ENVIRONMENTAL ASSESSMENT (Y-12, ORNL, CARL, AND ORGDP FACILITIES) 1974-1975

In the early part of 1974, the Atomic Energy Commission (AEC) decided that information should be compiled on the Oak Ridge facilities [Y-12, ORNL, Comparative Animal Research Laboratory (CARL), and Oak Ridge Gaseous Diffusion Plant (ORGDP)] for an environmental assessment to provide a basis for judging whether an environmental impact statement should be prepared for these facilities. The Environmental Sciences Division was requested to provide information for this document and to conduct a short-term aquatic surveillance program (ERDA, 1975, Vol. VI) to supplement the available data that would be used to describe the aquatic systems identified as possible

Table 3. Water quality data - East Fork Poplar Creek. Mercury concentrations in New Hope Pond discharges (Y-12) reported in annual environmental monitoring reports[a]

	Concentration (mg/L)[b]		
Year	Maximum	Minimum	Average
1971	0.007	0.0005	0.003
1972	0.0009	<0.0005	<0.0006
1973	0.001	0.0003	0.0005
1974	<0.0005	<0.0005	<0.0005
1975	0.0009	<0.0005	<0.0006
1976	0.0008	<0.0005	<0.0005
1977	0.003	<0.0005	<0.002
1978	0.002	<0.0005	<0.001
1979	0.004	<0.001	<0.002
1980	0.003	<0.001	<0.002
1981	0.002	<0.001	<0.002
1982	0.007	<0.001	<0.002

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[a] Environmental monitoring reports, (United States Atomic Energy Commission 1971-1973, United States Energy Research and Development Administration 1974-1976, United States Department of Energy 1977-1982) Oak Ridge Facilities.

[b] Monthly composite samples are analyzed. The annual values are based on an average of the results of the monthly analyses.

Table 4. Sediment data (dry weight basis)[a]
Mercury (µg/g)

Location[b]	1976	1977	1978	1979	1980	1981	1982
CS-1	<0.5	0.3	<0.2	<0.2	4	1	3
PS-2	2	26.6	7	35	4	6	
PS-3	11	11.9					
PS-4	2	12.2					
PS-5	8	1.4	2	<0.3	5	4	
PS-6	8	39	8	11	12	10	10
PS-7	68	1.8					
PS-8	1	1.6					
PS-9	10	11	2	3	5	3	
PS-10	<3	2.7	17	3	19	10	19
PS-11	<5	4.6					
PS-12	3	<2.9	6	<9	6	6	
PS-13	50	3.3					
PS-14	2	153.6					
PS-15	2	4.0	21	6	4	10	
PS-16	3	11.3					
PS-17	1	9.6	<2	<13	11	3	9
PS-18		20.4	5	4	10	6	9
PS-19		41.9	14	21	14	9	8
PS-21			6	<1	4	2	51
PS-22			3	7	13	96	
CS-20		0.4	<0.2	<0.2	1	3	3

[a] Average of two samples collected annually.

[b] Figure 9 - 1977 Environmental Monitoring Report.

areas of impact. It was realized that the data from this short-term survey would not be sufficient to assess the impact of the Oak Ridge facilities on aquatic biota (ERDA, 1975, Vol. VI), but they would aid in developing a more comprehensive monitoring program for impact analyses.

The survey was initiated in August of 1974 and continued through March of 1975. Locations of the sampling stations are given in ERDA (1975, Vol VI). Data from the survey were used along with routine monitoring data for the facilities and other information to publish a "Preliminary Draft Environmental Analysis, Oak Ridge Operations" (ERDA, 1975). Sediment analyses for mercury from the East Fork Poplar Creek and tissue analyses of fish from Poplar Creek were included in the report. It was stated on page 73 of Volume VII (ERDA, 1975) of the Preliminary Draft Environmental Analysis that preliminary analyses of tissue from fish collected in Poplar Creek showed mercury levels as high as 0.5 μg/g in bluegill and 2.0 μg/g in carp. These levels equaled or exceeded the then action level of 0.5 μg/g for commercial fish, as set by the U.S. Food and Drug Administration, which was subsequently changed to the present action level of 1.0 μg/g. It was also stated on page 73 of Volume VII (ERDA, 1975) that excessive mercury levels would preclude the use of Poplar Creek for fishing, both recreational and commercial.

The "Preliminary Draft Environmental Analysis, Oak Ridge Operations" (ERDA, 1975) was submitted to ERDA/ORO, along with a proposed sampling program (and a summary of the estimated cost), indicating that the monitoring program was needed to upgrade the analysis to the status of a draft environmental impact statement (Appendix 2, letter from R. F. Hibbs to R. J. Hart, December 1975). Circumstances evolving from this draft report and the proposed monitoring program played a role in the request that culminated in the Report on Mercury Contamination in Poplar Creek and the Clinch River (Elwood, 1977) (Appendix 3).

1977 UCC-ND MONITORING ACTIVITIES

The annual monitoring reports for the DOE-Oak Ridge Facilities were formal documents which were given state and local distribution.

The following is a quote from the 1977 Environmental Monitoring Report (Y/UB-8) with regard to the mercury in fish study which was conducted in 1976 and 1977:

> "As a result of higher than background mercury concentrations in creek sediments and known use of large quantities of mercury at the Y-12 Plant until 1963, a fish study in Poplar Creek and the Clinch River was undertaken in 1976 and 1977 to determine the significance of these findings. Both migratory and nonmigratory fish, including edible and rough species, were studied.
>
> During 1976 and 1977, 649 fish were analyzed. Sixty-two edible fish from this group contained mercury concentrations exceeding the proposed Food and Drug Administration (FDA) action level of 0.5 μg/g. Representative of average concentrations in fish taken from Poplar Creek near ORGDP are largemouth bass 0.72 μg/g, bluegill 0.42 μg/g, and crappie 0.23 μg/g. Fish taken from the Clinch River near Poplar Creek showed average concentrations in largemouth bass of 0.38 μg/g, bluegill 0.15 μg/g, and crappie 0.14 μg/g.
>
> While these mercury concentrations are higher than background measurements made from Melton Hill Reservoir fish (bass <0.02, bluegill <0.04, crappie 0.03), they do not constitute a toxicity hazard. The FDA proposed action level (proposed in December 1974) does not apply to individual fish, rather to averages, in order to control total mercury consumption. The action level is based on a consumption rate three times the national average plus an additional safety factor of ten as well. An overall safety factor of 30 results. Thus, while some of the fish taken in the vicinity of ORGDP exceeded the proposed action level, an extraordinarily high and protracted consumption rate of these fish would be needed in order to reach levels of concern."

The analysis of mercury in fish collected from the Clinch River was made a part of the ORNL monitoring program in 1978 and data from these measurements have been included in the Environmental Monitoring Reports beginning in 1978.

1977 ENVIRONMENTAL SCIENCES DIVISION REPORT ON MERCURY CONTAMINATION IN POPLAR CREEK AND THE CLINCH RIVER

In early 1976 (April or May), the Environmental Sciences Division (ESD) was requested to assist in the design and implementation of a study to determine the mercury concentration in fish in the vicinity of the Oak Ridge Gaseous Diffusion Plant (ORGDP). The request for ESD participation in the study and in preparing a report on the results was made at a meeting at the Y-12 Plant attended by staff from DOE/ORO (J. F. Wing, W. Hibbitts), UCC-ND (R. G. Jordan, H. H. Abee), ORGDP (M. E. Mitchell), Y-12 (M. Sanders), and ORNL/ESD (J. W. Elwood, L. D. Eyman).

Mitchell from the Environmental Management Department at ORGDP explained why they wanted the study done. The ORGDP staff was concerned that the elevated mercury level in the lower portion of Poplar Creek was coming from ORGDP. They wanted to know (1) if fish in the vicinity of ORGDP were contaminated with mercury, (2) if the contamination had spread into the Clinch River downstream of ORGDP, and (3) the source of the contamination (i.e., whether the mercury in Poplar Creek was from upstream sources, from ORGDP discharges, or both). Elwood and Eyman recommended sampling fish in the Clinch River, in Poplar Creek upstream and downstream of ORGDP, and in East Fork Poplar Creek. Sampling in East Fork Poplar Creek, which enters Poplar Creek just upstream of ORGDP, was recommended for two reasons. First, we were aware of local monitoring data showing elevated mercury levels in sediments (memorandum from Sanders to McLendon, August 1970, Appendix 4; Reece, 1974) and fish (memorandum from Sanders to McLendon, August 1970, Appendix 4) from this stream. Second, we were aware of mercury losses that had occurred at Y-12. Thus, in designing the fish sampling, our staff members considered the possibility that the mercury in sediments in the lower portion of Poplar Creek was coming from East Fork Poplar Creek. Subsequently, it was decided that the proposed sampling for this study would be limited solely to Poplar Creek and the Clinch River.

The 1976-1977 study did show significant mercury contamination of fish but did not identify the source(s) of mercury in Poplar Creek (Elwood, 1977). Analysis of unpublished data on mercury in East Fork Poplar Creek, which is contained in Elwood (1977), did suggest East Fork Poplar Creek as a likely source of mercury in Poplar Creek and the Clinch River. This suggestion is reflected in the recommendations contained in Elwood's (1977) report.

Subsequent to publication of the report, laboratory management was advised of the importance of and need for carrying out these recommendations (Appendix 4). The Abstract, Introduction, Recommendations, and Distribution List from the Elwood (1977) report are included as Appendix 3. Six memoranda relating to this report are included as Appendix 4.

INTERACTIONS WITH TVA

On May 4, 1977, two members of the DOE (then ERDA) Environmental Protection Branch and a member of the UCC-ND HSEA staff met with representatives of TVA's Division of Environmental Planning at TVA's offices in Chattanooga to provide TVA with the raw data then available on mercury in Poplar Creek and Clinch River fish. The group requested that TVA make a comparative assessment of the data with the TVA ongoing program for measuring mercury in fish in all of its reservoirs, and suggested that TVA consider incorporating these waters in their ongoing monitoring program. A positive interest was expressed in the suggestion, but it was indicated that internal discussions and budget review would be required before a decision on the matter could be reached.

Subsequent correspondence from TVA (letter from Brooks to Hart, dated August 2, 1977) to DOE (ERDA) indicated an agreement to design and implement a sampling survey in the Melton Hill Reservoir/Clinch River area in the vicinity of ORNL; however, later correspondence (letter from Brooks to Hart, dated March 27, 1978) stated that after a review of the rather extensive data base sent to them, they saw no need to collect any additional samples in Calendar Year 1978 and suggested that the situation be reappraised in January 1979 to determine the need for additional sampling.

ESD CONCERNS OVER MONITORING OF AQUATIC ENVIRONMENTS AT DOE-OAK RIDGE FACILITIES

During the course of the 1977 study of mercury contamination in Poplar Creek and the Clinch River, the ESD staff members involved reviewed available monitoring reports for DOE-Oak Ridge facilities to locate mercury data. They found a lack of data on mercury in fish or other biota, problems in interpreting the sediment mercury data in these reports, and problems with some of the procedures and methods used in monitoring for mercury. For example, in attempting to interpret mercury levels in sediments collected in the vicinity of one of the DOE-Oak Ridge facilities (ORGDP), they found that the limited distribution of sampling locations, the lack of data on mercury in effluents, and the lack of information on sediment particle size precluded our distinguishing among variations in mercury levels due to (1) differences in mercury discharges from this facility, (2) differences in mercury transport from DOE facilities upstream, and (3) textural differences in the sediment samples. As a result of these problems in the monitoring program, the data were inadequate for identifying the source(s) of the mercury or for assessing the trends in mercury levels in the area of this DOE-Oak Ridge facility (ORGDP). Our questions about the monitoring programs were reflected in the recommendations in the Elwood (1977) report just described and were further elaborated in a memorandum dated September 9, 1977, from S. I. Auerbach to C. R. Richmond, Associate Director for Biomedical and Environmental Sciences at ORNL. A copy of this memorandum is included in Appendix 4.

ECOLOGICAL STUDIES FOR THE ENVIRONMENTAL ANALYSES OF ORGDP AND ORNL FACILITIES

In 1976, ERDA/ORO decided that an impact statement should be prepared on the operation of the Oak Ridge Gaseous Diffusion Plant (ORGDP). Staff in the Environmental Sciences Division (ESD) were to be responsible for assessing the impacts of ORGDP operations on the aquatic and terrestrial environs. A decision was made that insufficient ecological data were available for this assessment and that additional studies should be conducted. The justification and need for such a baseline ecological survey were provided in a previous report related to operation of all the Oak Ridge facilities (ERDA, 1975). A sampling program was designed by ESD staff and submitted to ERDA/ORO for approval in January 1977 (letter from Auerbach to Wing dated January 1977, see Appendix 5). Sampling was initiated in April 1977 and continued through September 1978. A portion of this sampling program consisted of collection of fish from Clinch River and Poplar Creek sites above and below ORGDP for trace element analyses, including mercury. No sampling was conducted in East Fork Poplar Creek. Data from the baseline ecological survey were used to prepare an environmental assessment (not an environmental impact statement) which was published in December 1979 (DOE, 1979; see Appendix 5 of this testimony for title page and table of contents). All of these data, including the information on mercury concentrations in fish, water, and sediments in the vicinity of ORGDP, were later published in a separate report (Loar, 1981; see Appendix 5 for title page, table of contents, and distribution list).

Similar procedures and rationale were followed for evaluating the impacts of operation of Oak Ridge National Laboratory. A sampling program similar to the ORGDP survey was submitted for ERDA/ORO approval in March 1977 (letter from Auerbach to Wing dated March 1977; see Appendix 5). Sampling was initiated in March 1979 and continued through June 1980. Mercury concentrations were analyzed in fish collected from the White Oak Creek watershed and the Clinch River.

These and other ecological data were published in a report (Loar et al., 1981; see Appendix 5 for title page, table of contents, and distribution list) that provided a basis for an evaluation of the impacts of ORNL operations on the aquatic environs. This evaluation (or environmental analysis), which was not an environmental impact statement, was published in November 1982 (Boyle et al., 1982; see Appendix 5 for title page, table of contents, and distribution list).

ACTIVITIES IN 1982 AND 1983

Starting in April 1982 and continuing through the present, the Environmental Sciences Division has been involved in a number of activities for the Y-12 Plant related to the mercury contamination problem. The purpose of this section is to briefly highlight these activities. Supporting material is included in appendices.

Study to Determine Mercury Concentrations in East Fork Poplar Creek and Bear Creek in 1982

The Health, Safety, and Environmental Affairs Division at the Y-12 Plant requested the services of the Environmental Sciences Division in April 1982 to determine mercury concentrations in East Fork Poplar Creek and Bear Creek. The objectives of this study and assignment of responsibilities are summarized in an internal correspondence memorandum dated May 4, 1982 (See Appendix 6). We did not consider this short-term study in 1982 to represent a full implementation of the 1977 recommendations (Elwood, 1977) because of the limited scope and time frame of the study. The study was given high priority by both Y-12 and the Environmental Sciences Division and, as a result, the study was completed within a month and a draft report prepared for review before the end of May 1982. Van Winkle presented a briefing for Y-12 Plant Management on June 2, 1982 (see Appendix 7). The draft report received technical review by staff in the Environmental Sciences Division and the Health and Safety Research Division at ORNL and in the Health, Safety, and Environmental Affairs Division at Y-12. After technical approval by the appropriate managers at ORNL and Y-12, the final report was published on September 7, 1982. The Abstract, Introduction, Conclusions, Recommendations, and Distribution List from this report are included in this testimony as Appendix 8.

Mercury Concentrations in Fish in the Vicinity of ORGDP in 1982

At the same time we were performing the May 1982 study for Y-12, M. Mitchell, Head of the Environmental Management Department at ORGDP, requested the services of the Environmental Sciences Division in collecting fish upstream and downstream of ORGDP in Poplar Creek. The analyses were completed in October 1982 (see Appendix 9), but the results have not been interpreted or included in any report.

Survey of Drainage at Y-12

Results of the 1982 study (Van Winkle et al., 1982) confirmed that the Y-12 Plant area was still an active source of mercury to East Fork Poplar Creek. These results led immediately to discussion and design of further surveys for mercury contamination in drainage waters within the Y-12 Plant and investigations of the mass balance of mercury in New Hope Pond. The objective of these latter studies was to identify and characterize current sources of mercury entering East Fork Poplar Creek (see Appendix 10). The first phase of these additional studies was completed in fall 1982. Specific sources of mercury contamination were identified and a remedial action plan was developed and implemented to clean up these sources. Studies to further define the problem and to assess the effectiveness of clean-up measures are in progress. A draft interim report has been prepared by R. R. Turner of the Environmental Sciences Division and is currently undergoing technical review.

Mercury Concentrations in Hair and Other Tissues from Cows and Horses

Following up on Recommendation 3 in Van Winkle et al. (1982, p. 54) and in light of comments received during the review of this report (Appendix 11), hair samples were obtained in August 1982 from cows and horses, some of which were controls and some of which had been grazing on pasture grass in the contaminated floodplain of East Fork Poplar Creek and drinking water out of this creek. The rationale for sampling hair for mercury analysis is that mercury contamination of mammals, resulting from the consumption of contaminated food and water, is reflected in elevated levels of mercury in the hair of these animals. Due to suspected contamination of one of the hair samples during the chemical analysis, additional hair samples were obtained in November 1982. In addition, since one of the two cows sampled in November 1982 was being slaughtered for beef, samples of various other tissues (muscle, liver, and brain) were obtained for mercury analysis. These samples have been analyzed for total mercury, and preliminary results indicate no significant mercury contamination in the various tissues.

Literature Survey of Population Density Data for Selected Species of Sport Fish in Streams, Reservoirs, and Lakes

On October 18, 1982, G. J. Marciante, Environmental Protection Branch, Oak Ridge Operations Office, phoned J. W. Elwood regarding the feasibility of estimating the size of the bluegill population in East Fork Poplar Creek. Elwood suggested that quantitative estimates of the population at four or five locations could be obtained within a two-week period. Discussion, however, led to a more limited request from the Health, Safety, and Environmental Affairs Division at Y-12 to perform a literature survey. The report prepared by J. W. Elwood was transmitted to Y-12 with a cover memorandum dated November 9 (see Appendix 12).

E. NEED FOR ADDITIONAL STUDIES AND MONITORING OF MERCURY IN THE VICINITY OF THE DEPARTMENT OF ENERGY FACILITIES IN OAK RIDGE

Based upon experience to date, there appear to be a need for additional studies and monitoring of mercury in the Oak Ridge environs. We suggest it is necessary (1) to determine the spatial extent and magnitude of the mercury contamination, (2) to identify the active and residual sources of mercury, and (3) to determine the changes in the level of contamination over time.

We suggest as a first step that the spatial extent and magnitude of mercury concentrations in the streams and reservoirs downstream of the three DOE facilities in Oak Ridge be determined from measurements of mercury in surface and subsurface sediments, and some work has already been initiated. Sediments are reliable indicators of mercury contamination because the bulk of the mercury in contaminated streams and lakes is associated with sediments and the background level of mercury in sediments is well documented. Sediment surveys must be carried out with due regard for the effect of sediment particle size distribution on mercury concentration. Most of the past surveys around the Oak Ridge facilities have neglected to consider particle size and, thus, much of the historical data cannot be fully interpreted.

To document the spatial extent of contamination from the Y-12 Plant, we suggest that sediment sampling extend from the Y-12 discharge into New Hope Pond downstream into the Clinch River (Watts Bar Reservoir), at least to its confluence with the Emory River near Kingston, Tennessee. A survey of mercury in sediments will provide information on (1) how far downstream of the three DOE facilities in Oak Ridge the mercury contamination has spread, (2) the level of contamination of surface sediments from which biological organisms (e.g., fish) can accumulate mercury, (3) current levels of mercury in sediments at reference sites that can be sampled over time to establish temporal trends in mercury concentrations throughout the area, and (4) the location of any sizeable quantities of sediment-bound mercury that may need to be removed from streams because of the biological availability of the mercury to aquatic organisms and/or because of the susceptibility of the contaminated sediments to resuspension and transport, resulting in the downstream spread of contamination.

Regular sampling of mercury in sediments can also assist in identifying active sources of mercury discharges. Such a study would provide an inventory of the mercury associated with sediments in East Fork Poplar Creek, the stream in which mercury contamination appears to be most severe. Such an inventory is essential for assessing the role of residual mercury in subsurface sediments of East Fork Poplar Creek, derived from past releases, in sustaining surface sediment contamination. Based on an analysis of the current discharge of mercury from New Hope Pond and on the observed pattern of mercury concentrations in sediments and fish in East Fork Poplar Creek downstream of this pond in 1982, it is suggested that the current concentrations in surface sediments in East Fork Poplar Creek can be explained by the current discharge of mercury (about 1 to 2 oz/day) from the Y-12 Plant area. Resolution of the issue of the importance of past versus current mercury releases is germane to planning actions for reducing the mercury contamination in surface waters.

A study should also be conducted of mercury concentrations in the floodplain of East Fork Poplar Creek. This floodplain, portions of which are known to contain mercury above background levels, is contiguous with residential areas and recreational facilities in the City of Oak Ridge, and commercial and residential development adjacent to the floodplain is increasing. In addition, the floodplain is used for grazing a few cattle and horses. At least one family obtains its beef from cattle that graze on this floodplain and that drink water from East Fork Poplar Creek. One cow sampled from this area showed no significant mercury contamination in edible tissues. We suggest that this area be sampled to determine the level of mercury in soil and grasses on the floodplain, in air above the floodplain, and in hair of livestock (horses, cattle) grazing on the floodplain. Because of the possibility that mercury-contaminated sediments dredged from East Fork

Poplar Creek have been used in gardens, studies should also be conducted to determine the concentration of mercury in vegetables grown in these soils.

Finally, we suggest that a regular biological sampling program be initiated to determine the level of mercury in fish and other edible aquatic organisms in local streams and reservoirs. Such sampling should be done on a regular basis at selected sites, including uncontaminated tributaries, to establish temporal trends in mercury levels of aquatic organisms consumed by humans. We also suggest that a study be conducted to measure the density of sport fish in East Fork Poplar Creek where mercury levels in fish from the upper portions of the drainage currently exceed the FDA action level for mercury of 1.0 ppm (Appendix 12). Such a study would provide information on the number of catchable fish available to sport fishermen, and hence, the potential public health risk from the consumption of fish from this stream. This study would also provide baseline data on both mercury levels in fish and density of fish for comparison with data collected after the new sewage treatment plant on East Fork Poplar Creek begins operation. The operation of this sewage treatment plant is expected to significantly improve water quality in the stream. When this occurs, fish populations that are currently limited by poor water quality due to discharges from the old sewage treatment plant are likely to increase. This could, in turn, result in increased harvest of sport fish from East Fork Poplar Creek.

We suggest that results, including discussion, interpretation, and conclusions, from all subsequent studies and monitoring of mercury (and other contaminants) in the vicinity of the DOE facilities in Oak Ridge be published in a form useful to the public and the scientific community.

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BIOGRAPHICAL INFORMATION

CHESTER R. RICHMOND

Dr. Chester R. Richmond is the Associate Laboratory Director for Biomedical and Environmental Sciences at the Oak Ridge National Laboratory (ORNL). Dr. Richmond is responsible for all biomedical and environmental research supported by the Department of Energy (DOE) at ORNL. He also is responsible for related research sponsored at ORNL by other Federal agencies, including the National Science Foundation, the Environmental Protection Agency, and the Departments of Agriculture, Interior, and Health and Human Services. Four research divisions—Biology, Environmental Sciences, Health and Safety Research, and Information Research and Development, as well as the Life Sciences Synthetic Fuels Program—report to Dr. Richmond. The divisions contain a total of approximately 610 people. The multidisciplinary research programs in the biomedical and environmental sciences involve (a) biological studies of carcinogenic, mutagenic, and toxicological effects, including repair, of chemical and physical agents associated with energy and other technologies, (b) ecological studies of the effects of energy technologies on particular ecosystems, (c) assessments of present and future effects of energy-related products and byproducts, and (d) studies of the physics, chemistry, and quantitative measurement of these materials in the environment and the work place.

In May 1981 Dr. Richmond also became the Director of Health, Safety, and Environmental Affairs for Union Carbide Corporation's Nuclear Division.

Before joining ORNL in 1974, Dr. Richmond was Alternate Health Division Leader at the Los Alamos Scientific Laboratory (LASL). His research at LASL led to his being awarded an E. O. Lawrence Award in 1974 for "research in radiation biology of internally deposited radionuclides and outstanding contributions to the resolution of radiation protection problems." Dr. Richmond received the Radiation Research Society Award and delivered the G. Failla lecture in 1976. He is the author of more than 100 publications on radiobiology and health and environmental effects of energy production. He received his B.A. in Biology from New Jersey State College at Montclair and his M.S. and Ph.D. in Biology-Physiology from the University of New Mexico in Albuquerque. Since 1975, he has been a professor at The University of Tennessee/Oak Ridge Graduate School of Biomedical Sciences.

Dr. Richmond is a member of the International Commission on Radiological Protection Committee 2 on Secondary Limits and the International Radiation Protection Association. He is also a member of the U.S. National Council on Radiation Protection and Measurements. He has served on panels and coauthored reports for the International Atomic Energy Agency, the International Commission on Radiological Protection, and the Organization for Economic Cooperation and Development.

Dr. Richmond was the U.S. Scientific Advisor to the International Symposium on Health Impacts of Different Sources of Energy sponsored by the World Health Organization, the United Nations Environment Program, and the International Atomic Energy Agency in June 1981. He has served on the panel of the National Research Council Planning Conference on Synthetic Fuels and a Federal Interagency Task Force on Uranium Mining Hazards. Currently, he is a member of the U.S. DOE's Energy Research Advisory Board's Light Water Reactor Safety Research and Development Panel and represents ORNL on the Federal Interagency Task Force on Acid Precipitation.

Dr. Richmond currently serves on the advisory board for the Society for Risk Analysis. He is a Fellow of the American Association for the Advancement of Science and a member of Sigma Xi and numerous other professional societies.

January 1983

Biographical Sketch
of
Stanley I. Auerbach

Dr. Stanley I. Auerbach is the Director of the Environmental Sciences Division of the Oak Ridge National Laboratory.

He was born in Chicago, Illinois, on May 21, 1921. He received his B.S. degree and M.S. degree in zoology, specializing in ecology, from the University of Illinois in 1946 and 1947, respectively. His advanced graduate studies in ecology were done at Northwestern University, Evanston, Illinois. He received his Ph.D. from this institution in 1949. Following a year of postdoctoral studies, he joined the staff of Roosevelt University in Chicago, Illinois, where he served as instructor and assistant professor of biology until 1954. That year he joined the staff of the Health Physics Division of the Oak Ridge National Laboratory as a research ecologist. Under his direction, the ecological research program of Oak Ridge National Laboratory has developed into one of the largest units in the world devoted to research in ecology and environmental sciences. The Environmental Sciences Division is recognized worldwide for its interdisciplinary programs in ecosystem analysis, radiation ecology, and studies in the biogeochemistry and cycling of elements. He has been the President of the Ecological Society of America (1971-72) and, in addition, has been a member or chairman of a number of advisory committees in the National Academy of Sciences and in government agencies. He is a Fellow of the American Association for the Advancement of Science and is listed in Who's Who in America. He is a member of the following professional societies: American Institute of Biological Sciences, American Society of Agronomy, American Society of Zoologists, British Ecological Society, Ecological Society of America, Entomological Society of America, Health Physics Society, Nature Conservancy, Society of Systematic Zoology, and Wilderness Society. He has held numerous committee and officer posts in several societies and in the National Academy of Sciences. His research interests encompass effects of ionizing radiation on the environment; transport and effects of radionuclides in the environment; radioactive waste management; energy and environmental impacts; and ecosystem analysis.

Mr. GORE. I am going to call on you last, Dr. D'Itri. I want to call next on Dr. Nathaniel Revis with the Oak Ridge Research Institute. We are delighted to have you. Please proceed.

STATEMENT OF DR. NATHANIEL W. REVIS, OAK RIDGE RESEARCH INSTITUTE

Dr. REVIS. Thank you. Madam Chairman and Mr. Chairman, with your permission, I would like to read a condensed version of my testimony.

My name is Nathaniel William Revis and I reside at 1060 West Outer Drive, Oak Ridge, Tenn. After studying medicine at the University of Lousain, Lousain, Belgium, I entered graduate school at the University of Glasgow, Glagow, Scotland, and received a Ph. D. in biochemistry. I am a member of the American Society for the Advancement of Science and the Society of Toxicology. I have served for the last 6 years as a member of the Congressional Black Caucus Health Brain Trust. My professional career has been devoted to studying the molecular events associated with hypertension, cardiac hypertrophy and coronary artery disease, with an emphasis on the relationship of trace elements, that is, cadmium, mercury and lead, to these disease processes.

I am the director of the Oak Ridge Research Institute, Oak Ridge, Tenn., a position I have held since 1981. The institute is a private corporation which was established in April 1981. The primary goal of this institute is to establish a center of excellence for biological and toxicological studies. Our funding is primarily through grants from the Department of Energy, the Environmental Protection Agency, and the National Institutes of Health.

Mercury exists in the environment as the inorganic salts of mercury, elemental mercury, and organic mercury. The more common forms are the inorganic salts. The organic form is generally associated with pollution. The human health risk associated with organic mercury pollution was only fully realized 30 years ago.

In the early fifties, Japanese scientists reported a strange disease with peculiar neurological symptoms in a fishing village on Minamata Bay. Subsequent investigations revealed that this disease was associated with organic mercury pollution.

In 1965, the Japanese reported another outbreak of organic mercury poisoning similar to the Minamata disaster in villages in Niigata. Several years later, a similar epidemic of greater magnitude was reported in Iraq. These outbreaks were associated with several hundred deaths and the hospitalization of several thousand persons.

The clinical symptoms observed in these epidemics included: First abnormal sensations of the lips, fingers, and toes; second, loss of muscle coordination; third, difficulty in articulation; and fourth, the loss of vision and hearing.

Humans are exposed to mercury through food, water, and air. The epidemics in Japan and Iraq occurred as a result of persons eating food contaminated with methylmercury and phenylmercury. Since these outbreaks, several hundred scientific studies have been performed on methyl and phenylmercury to determine how they enter the food chain and how they are metabolized by various organisms, including human beings.

In summary, these studies show that both of these organic mercurials are readily absorbed and slowly excreted by most organisms. As a result of complete absorption and slow excretion, the half life of these compounds is considerably increased. Human and experimental studies have also shown that these compounds pass the blood brain barrier which can result in brain damage.

The gastrointestinal absorption of methylmercury is complete, whereas the absorption of the inorganic salts of mercury and elemental mercury range from 0.1 to 15 percent of the administered dose. The excretion of inorganic forms of mercury is greater than observed for methylmercury which results in a shorter half life for the inorganic forms.

The absorption of methylmercury via the gastrointestinal tract or the lungs is complete and the major organ affected is the brain. In contrast, the absorption of the inorganic salts of mercury via the lungs or intestinal tract affects primarily the kidneys. Elemental mercury absorbed via the intestinal tract primarily affects the kidney, whereas, absorption via the lung can affect both the brain and kidney. It is clear from this description that organic mercury is considerably more toxic than the inorganic forms of mercury.

High levels of mercury have been reported in soil sediment samples from East Fork Poplar Creek, which is a stream running through the Oak Ridge community. Because of the concern expressed by the citizens of Oak Ridge, Union Carbide contracted with the Oak Ridge Research Institute to perform acute toxicity studies in experimental animals. Soil sediment samples were obtained by Union Carbide from the banks of New Hope Pond and East Fork Poplar Creek, as shown in the figure in my testimony. The concentrations of the inorganic and organic mercury observed in these samples is shown in table 3 of that testimony. As shown, 98 percent of the mercury observed in these samples occurred in the inorganic form.

To determine the potential acute toxicity of this mercury, mice, rats, and pigeons were given a single dose of these soil samples. The toxicity was determined first, by observing the number of animals that died as a result of treatment; second, by measuring the amount of mercury that accumulated in the brain, liver and kidney; and third, by measuring damage to the liver and kidney. Results from these studies are summarized in table 4 and as show there, animal deaths and kidney and liver damage were not observed.

The present acute short-term studies were performed to determine the potential health risks associated with humans eating soil samples containing mercury and/or using sediment samples for small gardens. Soil eating has been described in the literature. It thus presents a potential health risk. Our data indicates that the amount of soil sediment necessary to induce neurological disorders in humans is greater than that which one may consume. Because of the relatively low level of organic mercury observed in these samples, it would appear that the risk to humans and the aquatic environment would be mininal. However, this risk could be increased if the level of methylmercury was substantially increased. Thus, constant monitoring of the soil sediment samples, the aquatic environment, fish and vegetation from these areas is suggested.

We also recommend chronic feeding studies of selected soil sediments to assess up to date health risks which may be associated with the various forms of mercury observed in soil sediments. Monitoring for other potential pollutants would also te recommended.

Thank you.

[The prepared statement of Dr. Revis follows:]

BACKGROUND

1.My name is Nathaniel William Revis and I reside at 1060 West Outer Drive, Oak Ridge, Tennessee. After studying medicine a the University of Louvain, Louvain, Belgium, I entered graduate school at the University of Glasgow, Glasgow, Scotland, and received a Ph.D. in biochemistry. I am a member of the American Society for the Advancement of Science and the Society of Toxicology I have also served for the past six years as a member of the Congressional Black Caucus Health Brain Trust. My professional career has been devoted to studying the molecular events associated with hypertension, cardiac hypertrophy, and coronary artery disease, with an emphasis on the relationship of trace elements (i.e., cadmium, mercury, and lead) to these disease processes.

2. I am the director of the Oak Ridge Research Institute, Oak Ridge, Tennessee, a position I have held since September 1981. The Institute is a private corporation which was established in April 1981. The primary goal of this Institute is to establish a center of excellence for biological and toxicological studies. Our funding is primarily through grants from the Department of Energy, the Environmental Protection Agency, and the National Institutes of Health.

3. Mercury exists in the environment as the inorganic salts of mercury, elemental mercury and organic mercury. The more common forms are inorganic salts. The organic form is generally associated with pollution. The human health risk associated with organic mercury pollution was only fully realized 30 years ago. In the early fifties, Japanese scientists reported a strange disease with peculiar neurological symptoms in a fishing village on Minamata Bay. Subsequent investigations revealed that this desease was associated with organic mercury pollution. In 1965, the Japanese reported another outbreak of organic mercury poisoning similar to the Minamata disaster in villages of Niigata. Several years later, a similar epidemic of greater magnitude

was reported in Iraq. These outbreaks were associated with several hundred deaths and the hospitalization of several thousand persons.

4. The clinical symptoms observed in these epidemics included; (1) abnormal sensations of lips, fingers, and toes, (2) loss of muscular coordination, (3) difficulity in articulation and (4) the loss of vision and hearing.

5. Humans are exposed to mercury through food, water and air. The epidemics in Japan and Iraq occured as a result of persons eating food contaminated with methylmercury and phenylmercury. Since these outbreaks, several hundred scientific studies have been performed on methyl and phenylmercury to determine how they enter the food chain and how they are metabolized by various organisms including humans. In summary, these studies show that both of these organic mercurials are readily absorbed and slowly excreted by most organisms. As a result of complete absorption and slow excretion, the half life of these compounds is considerably increased. Human and experimental studies have also shown that these compounds pass the blood brain barrier which can result in brain damage.

6. The gastrointestinal absorption of methylmercury is complete, whereas, the absorption of the inorganic salts of mercury and elemental mercury range from 0.1 to 15% of the administered dose. The excretion of the inorganic forms of mercury is greater than observed for methylmercury which results in a shorter half life for the inorganic forms. The absorption of methylmercury via the gastrointestinal tract or the lungs is complete and the major organ affected is the brain. In contrast, the absorption of the inorganic salts of mercury via the lungs or intestinal tract effects primarily the kidney. Elemental mercury absorbed via the intestinal tract primarily effects the kidney whereas, absorption via the lung can affect both the brain and kidney.

It is clear from this description that organic mercury is considerably more toxic than the inorganic forms of mercury.

ACUTE EXPERIMENTS

7. High levels of mercury have been reported in soil sediments from East Fork Poplar Creek, which is a stream running through the Oak Ridge community. Because of the concern expressed by the citizens of Oak Ridge, Union Carbide contracted with the Oak Ridge Research Institute to perform acute toxicity studies in experimental animals. Soil sediment samples were obtained by Union Carbide from the banks of New Hope Pond and East Fork Poplar Creek, as shown in Fig. 1. The concentration of inorganic and organic mercury observed in these samples is shown in Table 3. As shown, 98% of the mercury observed in these samples occured in the inorganic form. To determine the potential acute toxicity of this mercury, mice, rats, and pigeons were given a single dose of these soil samples. The toxicity was determined (1) by observing the number of animals that died as a result of treatment, (2) by measuring the amount of mercury that accumulated in the brain, liver and kidney, and (3) by measuring damage to the liver and kidney. Results from these studies are summarized in Table 4; as shown here, animal deaths and kidney and liver damage were not observed.

8. The present acute short-term studies were performed to determine the potential health risks associated with humans eating soil samples containing mercury and/or using sediment samples for small gardens. Soil eating has been described in the literature. It thus presents a potential health risk. Our data indicates that the amount of soil sediment necessary to induce neurological disorders in humans is greater than that which one may conceivably consume. Because of the relatively low level of organic mercury observed in these soil samples, it would appear that the risk to humans and the aquatic environment would be minimal. However, this risk could be increased if the level of methylmercury was substantially increased. Thus constant monitoring of the soil sediment samples, the aquatic environment, fish, and vegetation from these areas is suggested. We also recommend chronic feeding studies of selected soil sediments to assess up-to-date health risks which may be associated with the various forms of mercury observed in soil sediments. Monitoring for other potential pollutants would also be recommended.

Mr. **Gore**. Thank you for that excellent statement.

Dr. Charles Coutant with the city of Oak Ridge Environmental Quality Advisory Board. Welcome, Dr. Coutant, and we look forward to hearing from you.

STATEMENT OF DR. CHARLES COUTANT, CITY OF OAK RIDGE, ENVIRONMENTAL QUALITY ADVISORY BOARD

Dr. **Coutant**. Thank you, Mr. Chairman, Representative Lloyd. The Environmental Quality Advisory Board of the city of Oak Ridge thanks you for your invitation to participate in this hearing. Our 11 member voluntary citizen board is appointed by city council to advise it on matters related to the quality of our environment. We are not all technical experts, but we attempt to reflect the opinions and desires of our fellow citizens, and we are able to mobilize additional technical expertise as we need it.

Our board views the recent revelations about the magnitude of mercury releases from the Y-12 plant and the level of contamination of East Fork Poplar Creek and its environs with great interest and deep concern, but not alarmed. We definitely view questions of soil and water contamination within populated areas of our city to be within the scope of our responsibilities.

We have studied the information on mercury in the local environment as it has been released by the Department of Energy and other bodies. We have attempted to place these emerging data in the context of worldwide knowledge of mercury hazards through use of reports such as the 1978 National Academy of Sciences study, "An assessment of Mercury in the Environment," and through the use of other professional publications. Since the Oak Ridge National Laboratory is one of the world's most prominent research institutions in the study of mercury contamination of the environment, we have excellent resources for surveying the worldwide information available to us locally.

As a result of our review through May of this year, and more recently as more information has come out, we advised city council of our concern and we asked that all possible efforts be made to augment the limited data available on mercury in East Fork Poplar Creek with studies to evaluate any hazards to health and welfare of the residents of the city and surrounding areas.

We further recommended that a thorough contaminant assessment be made to determine likelihood of risk prior to any further changes or developments in the creek or its floodway or floodway fringe zones. And we appended a copy of that memorandum to our testimony. We are very pleased that such studies appear to be underway through the interagency task force.

We have to admit that we are chagrined that the Department of Energy and its precedessor agencies did not offer a more timely and thorough disclosure of the information available and that there was not a more responsible job of inventorying mercury levels in the creek following the large spills. One result of that silence was that the city of Oak Ridge was allowed to unknowingly use highly contaminated creek sediments as topsoil for a sewer relocation project just within the last year. Knowledgeable precaution would certainly have been preferable to an unwitting dispersal of something that was potentially hazardous.

We return to the statement that we are concerned but not alarmed. The hazards of mercury in general are fairly well known compared to many toxic wastes. Although concentrations of total mercury in creek and floodplain sediments and certain soils elsewhere that have received the topsoil obtained from the creek are very high relative to normal concentrations through North America, there appear to be few chances for the mercury to be passed to human populations at rates which would endanger health in an acute sense.

We assume as our standard for acceptable mercury intake rates the numbers that are cited in the National Academy report, which derived largely from work by Sweden and the World Health Organization. Those studies suggest 30 micrograms methylmercury per day or 200 micrograms per week as acceptable for a standard 70 kilogram human. For total mercury, the estimates are 300 micrograms per week. These levels are at least a factor of 10 below levels which actually cause observable toxic effects; that is, they included a safety factor.

Oak Ridgers would likely receive the highest intake rate from eating fish from East Fork Poplar Creek. However, few fish of edible size occur in the most contaminated upper stretches of the creek in relation to the intakes that would be required to get the high dose levels, and fishing has never been practiced extensively in the creek. Moreover, that activity is now banned.

Although Oak Ridgers have been concerned about mercury uptake through garden soil obtained from the creek floodplain, published information from throughout the world indicates that uptake of mercury by plants and vegetables or grass that would be eaten by cattle is relatively low. Meat and other tissue samples that were taken from an Oak Ridge steer that was pastured in the contaminated zone show a low uptake through the food chain—a small sample but it is indicative.

Breathing of contaminated dust, which has been suggested for playgrounds, would rarely cause a weekly accumulation of gram amounts of solid material in the lungs, which would be necessary for the most contaminated soils that have been analyzed so far. These comparisons of limited environmental samples in Oak Ridge with known hazardous exposures do not argue for a sense of complacency, but they should quell the alarm that has been expressed by some others.

Oak Ridge is not saturated with mercury. We do have an unfortunate legacy of the past of both physical contamination and an attitude of silent complacency. Our board strongly recommends that the East Fork Poplar Creek receive a detailed study to determine where the contamination is, how fast it is moving downstream and by what routes, what routes of transfer to human and animal populations need be regulated, and whether cleanup measures are warranted. We are encouraged by the level of interagency communication and cooperation that now seems to be addressed to the problem.

Thank you very much.

[The prepared statement of Dr. Coutant follows:]

TESTIMONY OF THE ENVIRONMENTAL QUALITY ADVISORY BOARD OF THE CITY OF OAK RIDGE, TENNESSEE

The Honorable Albert Gore, Jr.

The Honorable Marilyn Lloyd

The Environmental Quality Advisory Board of the City of Oak Ridge thanks you for your invitation to participate in this hearing regarding mercury in our local environment. Our 11-member, voluntary citizen Board is appointed by City Council to advise it on matters relating to the quality of our environment. We are not all technical experts, but we attempt to reflect the opinions and desires of our fellow citizens, and we are able to mobilize additional technical expertise when it is needed.

Our Board views the recent revelations about the magnitude of mercury releases from the Y-12 Plant and the level of contamination of East Fork Poplar Creek and its environs with great interest and deep concern, but not alarm. We definitely view questions of soil and water contamination within populated areas of our city to be within the scope of our responsibilties. We have studied the information on mercury in the local environment as it has been released by the Department of Energy or other bodies. We have attempted to place these emerging data in the context of worldwide knowledge of mercury hazards through use of reports such as the 1978 National Academy of Sciences study "An Assessment of Mercury in the Environment" and other professional publications. Since the Oak Ridge National Laboratory is one of the world's most prominent research institutions in the study of mercury contamination of the environment, we have excellent resources for surveying worldwide information available locally.

As a result of our review through May of this year, we advised City Council of our concern. We asked that all possible efforts be made to augment the limited data available on mercury in East Fork Poplar Creek with studies to evaluate any hazards to health and welfare of residents of the city and surrounding areas. We further recommended that a thorough contaminant assessment be made to determine likelihood of risk prior to any further changes or developments in the creek or its floodway and floodway fringe zones. A copy of our letter to City Council is attached as part of this testimony. We are pleased that such studies appear to be underway through an interagency task force.

We are chagrined that the Department of Energy and its predecessor agencies did not offer a more timely and thorough disclosure of the information available and that there was not a more responsible job of inventorying mercury levels in the creek following the large spills. One result of silence was that the City of Oak Ridge was allowed to unknowingly use highly contaminated creek sediments as topsoil for a sewer relocation project within the past year. Knowledgeable precaution would certainly have been preferable to unwitting dispersal of something potentially hazardous.

We return to the statement that we are concerned but not alarmed. The hazards of mercury in general are fairly well known compared to many toxic wastes. Although concentrations of total mercury in creek and floodplain sediments (and certain soils elsewhere that have received creek topsoil) are very high relative to normal concentrations throughout North America, there appear to be few chances for the mercury to be passed to human populations at rates which would endanger health. We assume as our standard for acceptable mercury intake rates the numbers cited in the National Academy study which derive largely from work by Sweden and the World Health Organization. They suggest 30 micrograms methyl mercury per day or 200 micrograms per week as acceptable for a standard 70 kilogram human. For total mercury, the estimate is 300 micrograms per week. These levels are at least a factor of 10 below levels which actually caused observable toxic effects (that is, they include a "safety factor").

Oak Ridgers would most likely receive the highest intake rate from eating fish from East Fork Poplar Creek. However, few fish of edible size occur in the most contaminated upper stretches of the creek, fishing was never practiced extensively in the creek and, moreover, that activity is now banned. Although Oak Ridgers have been concerned about mercury uptake through garden soil obtained from the creek floodplain, published information from throughout the world indicates that uptake of mercury by plants such as vegetables or grass that would be eaten by cattle is low. Meat and other tissue samples were taken from an Oak Ridge steer that was pastured in the contaminated zone and the results show a low uptake through the food chain. Breathing of contaminated dust would rarely cause a weekly accumulation of gram amounts of solid material in the lungs, which would be necessary for the most contaminated soils discovered so far. These comparisons of limited environmental samples in Oak Ridge with known hazardous exposures do not argue for complacency, but they should quell alarm.

Oak Ridge is not "saturated" with mercury. We do have an unfortunate legacy of the past of both physical contamination and an attitude of silent complacency. Our board strongly recommends that the East Fork Poplar Creek receive a detailed study to determine where the contamination is, how fast it is moving downstream (and by what routes), what routes of transfer to human and animal populations need be regulated, and whether cleanup measures are warranted. We are encouraged by the level of interagency communication and cooperation that now seems to be addressed to the problem.

Attachment

July 11, 1983

CITY OF
OAK RIDGE

615 / 483-5671 • POST OFFICE BOX 1 • OAK RIDGE, TENNESSEE 37830

June 6, 1983

Honorable Mayor and
Members of City Council
City of Oak Ridge
Oak Ridge, Tennessee

Attention Mr. M. Lyle Lacy, III, City Manager

Dear Members of Council:

The Environmental Quality Advisory Board of the City of Oak Ridge, at its regularly scheduled meeting on June 1, 1983, approved the following motion:

> "It was moved, seconded and passed that EQAB issue a statement to City Council expressing concern over mercury contamination in the Oak Ridge environment, asking that all possible efforts be made to study, evaluate and publicly discuss any hazards to health and welfare of residents of the City and surrounding areas, and recommending that a thorough contaminant assessment be made to determine likelihood of risk prior to any further changes in the East Fork Poplar Creek or developments within the floodway fringe zone."

We are, of course, all concerned over the recent information on quantities of mercury released to the East Fork Poplar Creek. Development of sound technical data on the nature and degree of risk to Oak Riders is believed by EQAB to be of the utmost priority. Past studies by DOE and its contractors have been valuable in this regard, but they are not sufficient for deciding among potential courses of future action for high quality community development along this stream.

Our recommendation for a contaminant assessment to estimate likely risks prior to any further changes or development along the creek and floodway fringe zone is not made lightly. Both potential developers and affected citizens need to understand the risks, if any, that could be entailed by a proposed development and the possible monetary costs of mitigations. We sincerely hope that the recommended pause in further development will not stifle orderly use of land in this area, but will ensure that any proposed changes will not aggravate the impacts of an unfortunate legacy of the past.

We reiterate our desire to assist the City and DOE in a rational evaluation of potential hazards of contaminants and in develolpment of land use plans for minimizing potential impacts.

Sincerely,

Charles C. Coutant, Chairman
Environmental Quality Advisory Board

jh

Mr. GORE. Thank you very much.

Our final witness on this panel is Dr. Frank M. D'Itri, who is a professor of water chemistry at the Institute of Water Research at Michigan State University. Just a word of introduction. When we began this investigation some 6 or 7 weeks ago, I attempted to identify the leading expert that we could find anywhere on mercury contamination, and all signs pointed toward Dr. Frank D'Itri.

He was the Chairman of the National Academy of Sciences Panel on Mercury and the Environment as far back as 1978 and has traveled all over the world to different sites dealing with different mercury contamination problems in all parts of the world. At my request, he has been in Oak Ridge since last Wednesday conducting an extensive examination of the entire matter, and we are delighted, Dr. D'Itri, at your willingness to share your expertise with us on this occasion.

We are honored to have you here and I invite you to proceed.

STATEMENT OF DR. FRANK M. D'ITRI, INSTITUTE OF WATER RESEARCH, MICHIGAN STATE UNIVERSITY

Dr. D'ITRI. Madam Chairman, Mr. Gore. On Friday, the Oak Ridger had an article where Mr. Coutant stated that the Oak Ridge Environmental Quality Advisory Board was concerned but not alarmed by the recent disclosure that DOE cannot account for 2.4 million pounds of mercury and that some of it had been released to the environment. I agree completely with Mr. Coutant's position.

My assessment, based on the documents and data that I have reviewed and what I have seen is that there is no immediate health hazard to the citizens of Oak Ridge or surrounding area. Nevertheless, I do have some serious concerns about the mercury pollution problem in your community which is as follows:

Over the years, most of the mercury that was released into the East Fork Poplar Creek was either degassed to the atmosphere or transported with sediments, usually during flood events, downstream and it now resides buried deep in the sediments of Clinch River. However, the problem will continue to a lesser degree because the Y-12 plant is still discharging mercury into the East Fork Poplar Creek which admittedly is small. The mercury discharge levels allegedly are in the range of 1 to 2 micrograms per liter or parts per billion.

However, when the daily volume of the flow was considered, this amounted to between 50 and 60 pounds of mercury discharged each year to the East Fork Poplar Creek through New Hope Pond. Given favorable environmental conditions in the stream, the 50 or 60 pounds of mercury coupled with the residual mercury in the sediments represents enough of a mercury source to continue the contamination problems, especially in the fish.

There is only one solution to this problem, and that is to completely eliminate all the mercury inputs into the stream, and this can only be done by treating the waste stream to remove the mercury before the water is released into the East Fork Poplar Creek.

This treatment process will require the cooling water portion of the stream be segregated from the waste stream—this is in the industrial ditch—so that it can be treated more completely and economically.

Mr. GORE. May I interrupt you at that point? How many million gallons are we talking about here total?

Dr. D'ITRI. My understanding from talking to people at the plant was that their total flow—average total flow—was 9 to 10 million gallons per day. Of that, 6 million is cooling water, which means no treatment——

Mr. GORE. All right, now that is an important point, and forgive me for interrupting you at this point, but this is just a basic thing that has to be done all over the country where you have two-thirds of the liquid involved clean adding to the volume and then you have got one-third that is contaminated, you are creating an unnecessary problem by mixing it all together and having three times as much volume contaminated.

Dr. D'ITRI. That treatment process was referred to back maybe 50 years ago as the solution to pollution is dilution.

Mr. GORE. It went out about——

Dr. D'ITRI. It went out about the same time.

Mr. GORE. All right, please proceed.

Dr. D'ITRI. As soon as the input of mercury is stopped, the creek system should begin to recover further and the mercury levels in the sediment and aquatic organisms should decrease accordingly. A long-time study should be initiated to monitor the rate and extent of the mercury removal from the water, the sediments and the aquatic organisms as the stream undergoes this recovery process.

Earlier today somebody said how long should we have the studies. I think the figure was brought up around 3 years. My experience based on other contaminated systems is that it would probably be closer to 5 years and possibly a little bit longer, depending upon the degree of contamination.

I may also add, based on concerns of the community with respect to using contaminated sediments in gardens, that the vegetables grown in contaminated soils should be included in this type of study.

No. 2—OK, that takes care of that.

So that is basically my assessment in terms of the mercury problem. I do not believe there is an immediate health hazard. I think that there is a reason for concern. I agree with Dr. Richmond's assessment in terms of the intakes that people would have. I think the saving grace here with respect to the fish is that, No. 1, there are none, and No. 2, if you can find them, they are very small. They are something like on the order of about 3 ounces or so.

Since the uptake of the mercury in the fish is a function of the age of the fish and the weight of the fish along with the degree of pollution of the stream, we really do not know what is the upper limit of contamination in the fish because we cannot get any large fish. Or I have not seen any data on large fish.

Now that I have addressed the mercury problem, I want to mention what I consider to be a more serious environmental human health risk which must be addressed with all deliberate speed.

This has to do with the disposal of hazardous chemicals at the Y-12 plant. Ths is such a serious problem or concern, that not only the Oak Ridge Environmental Advisory Board in the city of Oak Ridge—for them—but also for all the citizens of Tennessee, and they should be alarmed enough as to require the DOE to put an immediate stop to the practice.

Let me explain what I have seen and why it poses such a serious long-term environmental health hazard that will be very difficult and expensive to clean up, but must be cleaned up.

Much of the waste disposal practices I will briefly mention can be seen in a videotape film that was produced by DOE to show their contractors that I guess are coming in to take bids on the new treatment plant. I suggest that you request to view that film because it will simply reinforce my description of these unsafe disposal systems.

From what I saw, I would say basically that they do not have treatment systems. They have what I would describe as the best available technology for 1945, and that involves dilution, it involves seepage lagoons and it involves burial.

Three of the disposal procedures that I observed were the New Hope Pond, the S-3 ponds and the burial areas along Bear Creek, and I would like to address each one of them.

The New Hope Pond was built in 1963 and receives untreated discharges from between 50 and 100 individual discharge pipes which empty into headwaters of the East Fork Poplar Creek, or sometimes known as the industrial ditch. The type of these—by the way, somebody mentioned a figure even higher than 100, 250 I think was mentioned this morning.

The types of wastes which contribute to the daily 3 or 4 million gallon flow include metal plate rinse waters, residual mercury waste, laundry waste water, lab drains, coal pile runoff and other unidentified discharges. The largest contribution to the flow, 6 million gallons per day, comes from cooling water, which is used primarily to dilute the waste stream to meet the requirements of the New Hope NPDES permit. The purpose of the pond is to facilitate solid separation and adequate mixing to insure the waste water flow is diluted.

A secondary function of the pond is to stop and contain any spills which may occur at the Y-12 plant before it reaches the East Fork Poplar Creek.

My recommendation, if I were asked, would be to stop immediately any discharge of hazardous materials in the East Fork Poplar Creek and this would require that the cooling water be diverted directly to East Fork Poplar Creek and no longer used to dilute the waste steam and that the waste stream be treated to remove or degrade the hazardous waste prior to being discharged in East Fork Poplar Creek.

No. 2, the NPDES discharge permits be written to not only monitor the maximum allowable concentration—and that is all they are held for, is concentrations—and they are not even hazardous chemicals, they are just standard parameters, but I would include in there any hazardous chemicals that are coming down the pipe.

So that would be concentration limits, and on top of that, as every other industrial firm in the United States is held for, and that would be stream loading values. In other words, the maximum amount of material they can discharge in a day for each of the toxic materials.

For example, the monitoring of uranium, thorium, PCB, and mercury levels are not required by the current permit. Nevertheless if you check the data—the sediment data that was made available to me in the East Fork Poplar Creek downstream from New Hope, the sediments are highly enriched with respect to these pollutants, contains 1,006 parts per million of uranium, 171 parts per million of thorium, 6 parts per million PCB and 18 parts per million mercury.

The human health and environmental significance of these loadings in the sediments in the creek are simply not known. I am not saying there is a problem there now, I am just simply saying that those—that information I do not believe is known.

The S-3 seepage lagoons—the S-3 ponds are unlined earthen dike seepage lagoons, that is all they are, seepage lagoons. And the purpose of the things is to get rid of the liquid that is put into them and there are two ways that the liquid is removed. It is either going up, evaporating on your nice warm days down here or it seeps down into the soils under it.

And it receives approximately 1.5 million gallons per year of assorted liquid wastes which include acids, nitric, hydrochloric, hydrofluoric, stripping and cleaning solutions, metal plating wastes, halogenated and non-halogenagted organic solvents, for example, perchlorethylene and tri- and tetrachloroethane; various metals, aluminum, cadmium, beryllium, thorium, uranium; along with other unidentified wastes.

While some of the highly acid and the pH of these solutions—there are four ponds, one of them is being diverted to denitrification experiments; the other three are what I am describing here, the pH is 1.5 to 2.5 and that is highly acid and some of that liquid goes ahead and evaporates but most of it is lost through seepage and percolation into the soil beneath the lagoons or seeping laterally until it intercepts and flows into Bear Creek. The seepage process is enhanced by the highly acid nature of the wastes which react with and dissolve carbonate materials in the soils beneath the ponds.

This material then—in a way I am a little bit surprised that one of the ponds' bottoms have not fallen out from all the acid that has been put into it. I might add that the solution cavities that you have underground in this part of Tennessee have admittedly taken place over eons of years but it was the action of carbonic acids coming from carbon dioxide reacting with water, which is a very mild acid and nothing compared to this.

Chemical analyses of the ground water samples taken in the vicinity of the S-3 ponds and the burial area—and the reason I am including both of these is I could not separate out from the data which wells were where, but these were the data that I was given—showed extremely high levels of the following selected pollutants:

Methylene chloride, 56 parts per billion, the acceptable level under the EPA water quality criteria for ambient water is about 2; perchlorethylene, 28,700 micrograms per liter, the acceptable EPA ambient levels are 0.8; uranium, 838 micrograms per liter; thorium, 4,800, there are no limits; zinc, 96,000 parts per million; PCB 0.7 parts per million; mercury, 9.4 parts per million, this is quite high for mercury, drinking water standard is 2; magnesium is 55,000 parts per billion; cadmium, 875 parts per billion, drinking water standard is 10; copper, 2,870 parts per billion; lead, 2,670 parts per billion, drinking water standard is 50; chromium, 250, drinking water standard again is 50.

In addition, there are large quantities of nutrients present in the ground water and it is because of the concern for the large quantities of nutrients there, is the reason DOE is conducting the experiments on the denitrification. They want to find some way to minimize that.

While this type of liquid waste management was used in the 1950's and early 1960's, it has not been an acceptable method for obvious reasons since the late 1960's and early 1970's. In Michigan, it simply was not allowed after about 1965, and I do not think with the acid nature of the particular wastes that are going in there, that they would ever allow it.

My recommendations, if I were asked, is stop immediately—not next December—all discharges to S-3 ponds, as quickly as possible remove the highly acid liquid waste and the bottom sludge to a facility capable of treating and detoxifying these wastes.

The pond structure, in my opinion, should then be leveled and covered with some sort of a temporary, impervious cover, plastic cover, to prevent rainwater from percolating through the contaminated soil until a more permanent plan can be devised and implemented. I will get to that in a minute.

The burial pit areas are located along Bear Creek and I understand were opened in the 1950's as disposal sites for oils and solids contaminated with PCB's and other hazardous wastes. It is my impression that PCB oils, the straight PCB oils, were dumped into that pond. The waste disposal methods involve dumping the waste oils into either plowed soil or into an open trench from which they seep into the ground. The seepage process is aided by periodic additions of chlorinated and unchlorinated organic solvent. In other words, it is a convenient way to thin out the stuff and help it sink into the ground faster.

Now what I would like to do is cover a couple of these. The PCB oil and disposal trenches, and the magnitude of these things boggles my mind. These open trenches, 20 by 20 by 100 feet received PCB oils, oil or waste, chlorinated and unchlorinated solvents until 1973. In 1978, some of the oil waste applied earlier began to seep out of the hill below the disposal site and began flowing into a small tributary of Bear Creek.

A dam was built on this tributary to contain this oozing oil that contained—was contaminated with PCB's. On the surface of this oil pond or this pond that was dammed up, the heavy oil layer is contaminated with PCB. One piece of data that I saw said about 900 milligrams per kilogram, 900 parts per million.

It is periodically skimmed off from the surface of the pond for disposal elsewhere, but the other thing that is important is the water that is being kind of siphoned out of that flows into Bear Creek and it has been in contact with all these materials that have leached out of the side of the hill. So there is really a question in my mind as to what type of materials are contained in there.

From 1973 until 1978, non-PCB contaminated oils; those were the ones with less than 50 parts per billion, were dumped in there along with coolants. I think the practice stopped in 1978. There is also what is called an oil land farm and this is using land treatment to decompose oils and basically what it is is a plowed field near Bear Creek that received PCB polluted oil wastes until 1978 and only unpolluted ones now, less than 50 parts per billion, after 1978.

The oils in all likelihood contain chlorinated and unchlorinated solvents. The site is located so that the rain causes a surface runoff problem and there is also the possibility of these materials percolating into underground aquifers and the rain water would flush the solvent portions of that into the ground waters and possibly into Bear Creek.

There were what was called the evaporation and dry well areas. This was an area containing dry wells. My understanding of the construction of these was that they dug a pit and then lined the pit or filled part of the pit with gravel and put in a standpipe and then filled it up. The same sort of dry well that you would have for a septic tank.

So then they would dispose of halogenated and unhalogenated solvent and other chemical wastes and it is my understanding that cyanides were disposed there or in other places by just simply pouring them down a standpipe.

There is little chemical data available on these sites but the data that is available is that the ground water near it contains 23,000 parts per billion perchlorethylene.

And then there is also the solid disposal sites and these are pits again 20 by 20 by 150 feet and when they are buried—or when they are dug, they are so deep in that area that there is usually about 2 or 3 feet of standing ground water. In other words, that is where the water table is. They receive scrap metal such as uranium chips, enriched uranium and other various types of solid waste.

I have—my recommendations followed along what you have been talking about in the panel. If you want, I can cover that or——

Mr. GORE. We are running short on time, if you could wrap it up relatively quickly.

Dr. D'ITRI. That is it.

[The prepared statement of Dr. D'Itri follows:]

ENVIRONMENTAL POLLUTION OVERVIEW ASSESSMENT: THE OAK RIDGE, TENNESSEE, COMPLEX

by

Frank M. D'Itri

Professor of Water Chemistry, Institute of Water Research and Department of Fisheries and Wildlife, Michigan State University, East Lansing, Michigan 48824-1222.

FOR

The Joint Hearing of the United States House of Representatives and the Subcommittee on Investigations and Oversight on "The Impact of Mercury Releases at the Oak Ridge Complex". American Museum of Science and Energy, 300 South Tulane Avenue, Oak Ridge, Tennessee, July 11, 1983.

I am very pleased to have the opportunity to appear before this joint hearing of the Subcommittee on Energy and Production and the Subcommittee on Investigations and Oversight to present my assessment of the environmental impacts of the mercury and other waste releases at the Oak Ridge Complex. This testimony reflects a preliminary overview of the multitude of the hazardous waste disposal problems at the Y-12 plant. The recommendations suggest only initial steps in what must be a complex, comprehensive program designed to eliminate current problems caused by previous hazardous waste discharges and prevent future problems by designing appropriate waste treatment and monitoring procedures. The methodology should also be designed to enhance knowledge of research and design techniques that will extend the technology and/or state-of-the-art.

In the July 8, 1983, issue of The Oak Ridger, Mr. Coutant stated that the Oak Ridge Environmental Quality Advisory Board was "concerned but not alarmed" over the recent disclosure that the Department of Energy (DOE) cannot account for 2.4 million pounds of mercury and that some of it has been released into the environment. I agree completely with Mr. Coutant's position. My assessment, based on the documents and data I've reviewed and what I have seen, is that there is no immediate health threat to the citizens of the Oak Ridge area. Nevertheless, I do have some serious concerns about the mercury pollution problem in your community. These are as follows:

Over the years, most of the mercury that was released into the East Fork Poplar Creek was either degassed to the atmosphere or transported downstream with the sediments, usually during floods, and it now is buried at the bottom of the Clinch River and Watts Bar Lake. However, the problem will continue to a lesser degree because the Y-12 plant is still discharging mercury into the East Fork Poplar Creek. While the mercury discharges are small, allegedly in the range of 1-2 ug/l, when the daily volume of flow is considered, this amounts to between 50 and 60 pounds per year being discharged from the New Hope Pond. Given favorable environmental conditions in the stream, the 50 to 60 pounds coupled with the residual mercury in the sediments is enough to continue the contamination problem, especially in the fish. The only solution is to eliminate all mercury inputs to the stream. This can only be done by treating the waste flow to remove the mercury before the water is released to the East Fork Poplar Creek. This treatment process will require that the cooling water portion of the waste stream be segregated from the waste stream so that it can be treated more completely and economically.

As soon as the input of mercury is stopped, the creek system should begin to recover, and the mercury levels in the sediments and aquatic organisms should decrease accordingly. A long-term study should be initiated to monitor the rate and extent of mercury removal in the water, sediments, and aquatic organisms as the stream undergoes the recovery.

Now that I've addressed the mercury problem, I want to mention what I consider to be a much more serious environmental and human health risk which must be addressed with all deliberate speed, the disposal of hazardous chemicals at the Y-12 plant. This is such a serious problem that not only the Oak Ridge Environmental Quality Advisory

Board and the citizens of Oak Ridge, but all the citizens of the state of Tennessee should be alarmed enough as to require DOE to put an immediate stop to the practice. Let me explain what I have seen and why it poses a serious long-term environmental health hazard and will be very difficult and expensive to clean up although it must be done. Many of the waste disposal practices that I will briefly mention can be seen on a video tape produced by DOE. I suggest that you request to view it because it will reinforce my description of these unsafe disposal systems.

THE Y-12 PLANT WASTE DISPOSAL PROCESS

The Y-12 facility disposes of about 3,000,000 gallons of liquid wastes per year. The major wastes are about 600,000 gallons of nitrate (20%); 400,000 gallons of denitrification sludge (15%); 750,000 gallons of plating plant wastes, spent acids, and bases (25%); the remainder is composed of oils and solvents. These, along with the solid wastes, are disposed of, not treated, by methods which are environmentally unsafe and pose a potential long-term health hazard not only for human beings but also for the surface and underground resources of the state of Tennessee.

The waste disposal process at Y-12 consists of (1) the dilution of liquid wastes dumped in the head waters of East Fork Poplar Creek (the "Industrial Ditch") with 6 million gallons of essentially potable water released from the cooling towers to the point where they meet the conditions of their National Pollution Discharge Elimination System (NPDES) permit; (2) the use of seepage lagoons (S-3 ponds) to dispose of about 1,500,000 gallons per year of a wide variety of plating plant wastes, sludges, halogenated and non-halogenated solvents, a variety of acids, and stripping and cleaning solutions. While some of this liquid evaporates, most is percolated into the groundwater or seeps into Bear Creek; (3) the use of surface or underground land disposal for a wide variety of PCB contaminated oils, halogenated and non-halogenated solvents, organic coolants, 875 ug/l (drinking water standard is 10 ug/l); copper, 2870 ug/l; lead, 2670 ug/l (drinking water standard is 50 ug/l); chromium, 250 ug/l (drinking water standard is 50 ug/l). In addition, the large concentrations of nitrate in the groundwater under the S-3 ponds has prompted DOE to try to denitrify the waste before disposal.

While this type of liquid waste management was used in the 1950s and early 1960s, it has not been considered to be an acceptable method since the middle 1960s because the underground aquifers become polluted, and this damage is more difficult to correct than the initial surface contamination.

Recommendation

Immediately stop all discharges into the S-3 ponds. As quickly as possible, remove the highly acidic liquid wastes and bottom sludges to a facility capable of treating and detoxifying these wastes. The pond structures should then be leveled and covered with a temporary impervious cover (i.e., plastic) to prevent rainwater from diluting and percolating the pollutants through the contaminated soils until a more permanent plan can be devised and implemented.

THE BURIAL PIT AREA

The burial pits located along Bear Creek were opened in the 1950s as disposal sites for PCB oils, solvents, and oils contaminated with PCBs and other hazardous wastes. The waste disposal methods involved dumping the waste oils onto plowed soil or into an open trench from which they seep into the ground. The seepage process is augmented by the periodic addition of chlorinated and unchlorinated organic solvents.

The PCB Oil Disposal Trenches

The open trenches (20' x 20' x 100') received PCB oils, oil wastes, and chlorinated and unchlorinated solvents until 1973. In 1968 some of the oil waste applied earlier began to seep out of the hill below this disposal site and began flowing into a small and a wide variety of solid wastes, including uranium and other heavy metals. Most of the PCB contaminated oils, substantially thinned by the organic solvents, are percolating into the groundwater or seeping into Bear Creek. None of these pollutants are identified or quantified until the wastes have traveled 5 miles and have been substantially diluted by water entering Bear Creek over that distance. Even then the DOE's NPDES permit requires them to only report the pH and the concentration of oil and grease.

NEW HOPE POND

New Hope Pond was built in 1963 and receives the untreated discharges of between 50 and 100 individual discharge pipes which empty into the headwaters of East Fork Poplar Creek. The types of wastes which contribute to the daily 3-4 million gallon flow include metal plating rinse water, residual mercury, laundry wastewater, laboratory drains, mop water, coal pile runoff, and other unidentified discharges. The largest contribution to the flow (6 million gallons) comes from cooling water which is used primarily to dilute the waste stream to meet the requirements of the New Hope Pond NPDES permit. The purpose of the pond is to facilitate solids separation, equilibration, and adequate mixing to insure that the wastewater flow is diluted. A secondary function of the pond is to stop and contain any spills which might occur in Y-12 before they reach the East Fork Poplar Creek.

Recommendations

1. Immediately stop any discharge of hazardous wastes into the East Fork Poplar Creek. This will require that the cooling water be diverted directly into the East Fork Poplar Creek and no longer be used to dilute the waste stream. Instead the wastewater should undergo treatment to remove or degrade the hazardous wastes prior to being discharged into the East Fork Poplar Creek.

2. Rewrite the NPDES discharge permit to monitor not only the maximum allowable concentration of hazardous chemicals but also to set daily maximum stream loading limits for each of the toxic materials. For example, the monitoring of uranium, thorium, PCB, and mercury levels are not required by the current permit. Nevertheless, sediments in the East Fork Poplar Creek downstream from the New Hope Pond contain 1006 mg/kg uranium, 171 mg/kg thorium, 6 mg/kg PCBs, and 18 mg/kg mercury. The human health and environmental significance of these loadings in the sediments of the creek are not known.

THE S-3 SEEPAGE LAGOONS

The S-3 ponds are unlined earthen diked seepage lagoons which receive approximately 1.5 million gallons per year of assorted liquid wastes which include: acids (nitric, hydrochloric, and hydrofluoric), stripping and cleaning solutions, metal plating wastes, halogenated (perchloroethylene, halomethanes, haloethanes), and non-halogenated solvents various metals (aluminum, cadmium, beryllium, thorium, and uranium), along with other unidentified liquid wastes.

Although some of the highly acid (pH 1.5-2.5) liquid evaporates, most of it seeps or percolates into the soils beneath the lagoons or seeps laterally until it intercepts and flows into Bear Creek. The seepage process is enhanced by the highly acid nature of the wastes which react with and dissolve the carbonates in the soils beneath the ponds.

Chemical analyses of groundwater samples taken in the vicinity of the S-3 ponds and burial areas show extremely high levels of the following selected pollutants: methylene chloride, 56 ug/l (acceptable level under the Environmental Protection Agency (EPA) water quality criteria for ambient water is 1.9 ug/l); perchloroethylene, 28,700 ug/l (acceptable level under the EPA water quality criteria for ambient water is 0.8 ug/l); uranium, 838 ug/l; thorium, 4,800 ug/l; zinc, 96,000 ug/l; PCBs, 0.7 ug/l; mercury, 9.5 ug/l (drinking water standard is 2 ug/l); manganese, 55,000 ug/l; cadmium, tributary of Bear Creek. A dam was built on the tributary to contain the oozing PCB contaminated oil on the surface of the pond. The heavy oily layer which is highly contaminated with PCBs (about 900 mg/kg) is periodically skimmed from the surface of the pond for disposal elsewhere. From 1973 until 1978 non-PCB contaminated oils (i.e., less than 50 ug/l PCB) and coolants were dumped into the trenches. In 1978 this disposal practice was discontinued.

Recommendation

Studies should be initiated immediately to establish the extent of the groundwater contamination. A procedure to clean up the site should be drawn up and implemented as soon as possible.

Oil Land Farm

This plowed field near Bear Creek received PCB oil wastes until 1978 and only unpolluted oils (i.e., less than 50 ug/l PCB) after 1978. The oils, in all likelihood, also contain chlorinated and unchlorinated solvents. The site is located so that rain causes both a surface runoff problem and a percolating problem as the more soluble pollutants can be flushed into the groundwaters and possibly Bear Creek.

Recommendation

Studies should be initiated immediately to establish the extent of the groundwater contamination. A procedure to clean up the site should be drawn up and implemented as soon as possible.

Evaporation and Dry Well Area

This area contained "dry wells" (i.e., stand pipes terminating in buried gravel filled pits) and combination seepage and evaporation pits to dispose of halogenated and non-halogenated solvents and other chemical wastes including cyanides. The few chemical data available on this site show that the groundwater contains 23,200 ug/l perchloroethylene.

Recommendation

Studies should be initiated immediately to establish the extent of the groundwater contamination. A procedure to clean up the site should be drawn up and implemented as soon as possible.

Solid Disposal Pits

These pits are about 20' x 20' x 150' and often have standing groundwater in them. They receive scrap metal such as uranium chips, enriched uranium wastes, and various other types of solid wastes.

Recommendation

Studies should be initiated immediately to establish the extent of the groundwater contamination. A procedure to clean up the site should be drawn up and implemented as soon as possible.

ANALYTICAL METHODS

The analytical methods employed by the Y-12 plant personnel should include the proper sampling, handling, storage, analytical procedures, and chain of custody requirements published by the U.S. EPA. This includes the use of flow proportioned composite sampling at all of the water sampling stations. In addition, the analytical procedures must be sensitive enough to measure the hazardous compounds at levels that are environmentally significant. For example, the low analytical sensitivity of some instruments allow the DOE to report that the hazardous chemical must be present at concentrations greater than 10 ug/l before they can be determined analytically. These analyses are useless when the compounds are environmentally significant at

Mr. GORE. We may get into that on questions. Thank you very much for that extensive testimony and the work that you have put into it.

You said that the Department of Energy has prepared a 20-minute videotape which you have seen and which the staff of the subcommittee has seen. In your opinion, Dr. D'Itri, is it a relatively candid and full explication of what the task is that needs to be confronted now by the Government and by the new contractor?

Dr. D'ITRI. I do not think that anybody can get a full understanding of what is going on out there without actually walking around and seeing it. Now it is one thing to see the S-3 ponds on the film, but they do not move, they just lay there and they look like kind of nice little ponds. You wander around the burial area and say the camera pans across it.

The seepage coming out of the side of the hill or the oil pond, you did not see, but you just simply do not get the smells you get when you wander around it, you do not see the oils oozing out of the side of the hill.

But other than that, it is graphic enough to where it——

Mr. GORE. Well, the point I am getting at is that the film seemed to convey the impression that the Department of Energy, which recently prepared this film, is aware of the magnitude of the task that now confronts it.

Dr. D'ITRI. I do not think that anybody that would let something like this happen is aware of the magnitude of the problem.

Mr. GORE. Well, our goal is to see that as quickly as possible this matter is solved and that the best available technology for 1983 is put in place. And having discussed this with the Department of Energy representatives down here on the scene and State and Federal environmental authorities, I am hopeful that we really have a unified effort and a commitment and a determination to see that that is done. Certainly these two subcommittees are going to try to make certain that that is the case.

Now you mentioned that in your view, your earlier statements about there being no imminent threat to human health from the mercury, were correct. You also said that in your view the mercury is now in—buried in sediments at the bottom of the Clinch River. Is that the best guess?

Dr. D'ITRI. At this point, I would say that is the best guess. I think that the studies that have been suggested, that would be one of the areas that they would investigate, but that is typically what would happen with respect to the movement of mercury in the environment.

It ties up with the sediment; particulate matter is directed to the sediment; it tends to stay there until some event comes along; the bigger the flood the further it moves. And then when you get downstream in the Clinch River where you are coming into the dam area and the material is dropping out to the bottom, the waters down there are relatively quiescent, so it is not going to move very fast or very far.

But the important thing about mercury is that that is Mother Nature's way of purifying the system, not only of mercury but many of the pollution problems; and that is, to tie them up in particulate matter and then bury them. That is a natural process and

I think that is taking place and I think that in my opinion from what I have seen and read, I believe that with respect to the mercury problem, we are on the tail end of it here. All of it has either been moved down—now there is residual mercury there and you are going to have to address that, but I think that we are on the tail end of that particular problem.

Mr. GORE. But we need to stop the continuing discharges.

Dr. D'ITRI. Very definitely.

Mr. GORE. Even though they are relatively small compared to what was being discharged, they are enough to continue producing the kinds of readings in plants and fish that are now present; is that correct?

Dr. D'ITRI. Right. I think, for example, there is probably mercury in many of the old drains and the plumbing of Y-12, and I think if you had, say, a 100-year storm that just came on and washed everything down, I think you would get a big shot of mercury. And the way it is set up now, it just goes straight through the system, whatever is tied up and held in New Hope is there.

But if you diverted the flows and treated the water, then you should be able to handle it.

Mr. GORE. Well, there is an excellent graph that was part of Dr. Richmond's and Dr. Auerbach's statement which shows the peak discharge incidents—yes, sir, that is the one—and in 1973 and 1975, I cannot remember the exact dates there, but it looks as if after the main discharges were completed, there were some peaking events at 2- or 3-year intervals after that which seemed to be associated with large storms flushing out the system at that time. Is that the way you would interpret that, Dr. D'Itri?

Dr. D'ITRI. No. But I think over time, and that is why I put the time frame at 5 years, I think there is enough time to address the problems. As I said before, I do not think there is a health hazard, but I think it is going to take 5 years and it is going to be 5 years after they start treating the waste out at Y-12.

Mr. GORE. Well, we will have a number of specific recommendations and we will review your testimony and others in trying to address that, but just recapping briefly—and then I will call on you, Dr. Richmond—we ought to cut off the continuing discharges of mercury that are still occurring. There ought to be diligent monitoring of the mercury situation and the acquisition of better data on where it is located and its distribution and so forth. Is that correct?

Dr. D'ITRI. That is absolutely correct.

Mr. GORE. Now you seem to feel somewhat more concerned about some of the other problems that you discuss. It is your view, is it not, that with those problems as well, there is no imminent threat to the human health of the citizens in this area?

Dr. D'ITRI. No; at this particular time I would say no, and I have two reasons for saying that. No. 1, the drinking water supplies in this part of Tennessee come from the Clinch River and so there are no ground water supplies for drinking; and No. 2, the reservation here is quite large and so consequently I think that would tend to contain it. But I think it is very important that some sort of study be initiated to determine the extent of the movement of these pollutants both from the burial pit and the S-3 ponds.

And one thing I did not mention, for example, there is no monitoring on Bear Creek—well, when I say no monitoring, there is no significant monitoring on Bear Creek. The S-3 ponds and the burial pits are 5 miles upstream from where the NPDES permit station is, and by the time the materials get down there, they have been diluted substantially—again, the solution to dilution—well, anyway—the solution to pollution is dilution, I will get it right.

They have been diluted out so that by the time they get down to the discharge point where they actually do have an NPDES station, the only thing that remains is this pH and the oil and grease, and again it is concentration. They should be looking at PCB, they should be looking at halogenated hydrocarbons, and they should be looking at thorium, cadmium, mercury, a whole host of things because that material is going to ultimately flow down and tie in with Poplar Creek and then the Clinch River.

Mr. GORE. But to have an accurate cap placed on your testimony, while you do not see an imminent threat to the public health from these other things, you do feel some sense of urgency that these other problems be addressed as quickly as possible; is that correct?

Dr. D'ITRI. Absolutely. I think that the practices should stop yesterday. There is no excuse for today with the technology that we have, to be reverting to those types of disposals—they are not treatment methods, they are disposal methods. And they are destroying the ground water resources of the State of Tennessee. I do not know what the extent of that will be, but there are going to be portions of it that will not be recoverable.

Mr. GORE. I want to stop now, but, Dr. Richmond, I interrupted you. Did you want to make a response earlier?

Dr. RICHMOND. Yes. The point you made is a good one about the source of the material to the East Fork Poplar Creek. I took the liberty of putting an additional piece of information on this chart, but I need to turn it.

Mr. GORE. Fine. That is the graph that I was referring to earlier. The peak event has been where, 1954, 1955?

Dr. RICHMOND. Yes, sir, back in those years. This is figure 1, page 20.

Mr. GORE. Now to clarify this, the vertical edge of the chart measures thousands of pounds of mercury discharged, correct?

Dr. RICHMOND. Yes, sir.

Mr. GORE. And then the horizontal line dates run from 1955 to the third quarter of 1982.

Dr. RICHMOND. Yes, that is 1982, through there.

Several things are significant. Most of the material lost, if you can imagine from the area under the peak, occurred during the process that I marked in red at the top, it was an acid wash. When that was corrected, the discharge rate, the amount per day, decreased very, very rapidly. The total amount lost during that time is estimated to be about 239,000 pounds. Mr. La Grone's testimony gave a range. Our best current estimate is toward the value of 239,000 pounds.

Beyond that time, where the curve is essentially flat, the loss is approximately 1.4 ounces per day, again based on the 1981-82 measurements, which translates to about one liter per year. So the levels have been relatively low since the time period when the initial curve dropped down very readily. That material we believe, much of that has rapidly moved down through the local creek system and out beyond East Fork Poplar Creek in other areas.

I might mention one other point, that the total amount of mercury associated with the major release to the aquatic environment for these particular processes, the 239,000 pounds, to put that in perspective, that amounts to about 2,000 gallons of mercury, if I remember my arithmetic correctly.

Mr. GORE. The reason the discharges trail off so sharply is that the process which produced these discharges was discontinued in 1958?

Dr. RICHMOND. That is correct.

Mr. GORE. OK, thank you.

Dr. RICHMOND. Actually before the New Hope Pond was built.

Mr. GORE. I apologize for taking so much time and I appreciate my colleagues' indulgence.

Mrs. LLOYD. Thank you very much. We want to thank all you gentlemen for your very excellent testimony.

Dr. D'Itri, looking back over Mr. La Grone's testimony, you say that there is currently discussion with EPA and the State of Tennessee, as previously discussed, on handling the S-3 pond matter on an interim basis, but the long-term solution is construction of the central pollution control facility and hopefully we can get the money and move on with this project.

Would you please comment on the situation as you have reviewed it in relation to the central pollution control facility, the impact of this?

Dr. D'ITRI. I think I agree with what you say. There is no doubt in my mind that the Oak Ridge consolidated facilities, and I would probably include in that, K-10—I am only familiar with Y-12, but all three facilities desperately need some way of handling these hazardous materials. I guess I wind up saying again I think that the S-3 ponds should be closed yesterday.

Mrs. LLOYD. Would all of you not agree that the danger to which bacteria can methylate mercury in this environment is subject to change and the degree of methylated mercury is certainly an item of concern, but the availability of mercury under certain conditions certainly is subject to change. Dr. Richmond, would you comment on this?

Dr. RICHMOND. Yes, I think that is one of the reasons why many of the witnesses that you have heard today so far call for additional monitoring. Water samples are also taken, and that is also an indication of how much mercury is being released provided you do the analysis properly to see which portion is organic.

Mrs. LLOYD. I was referring to inorganic mercury levels in sediments and soils could be so high in some areas that bacteria which normally methylate mercury cannot survive in that case.

Do you feel that your directives are being carried out, Dr. Richmond?

Dr. RICHMOND. I am sorry, I do not understand the question.

Mrs. LLOYD. Your recommendation referencing this situation, do you feel that your recommendations are being considered by DOE effectively?

Dr. RICHMOND. I think current recommendations and current actions, yes. There were discussions earlier about the question of where certain quantities of mercury may currently reside in sediment. There are activities under way now to look at the sediment from different bodies of water below the creek systems to try to get a better feel for the inventory, if you will, mobilization of mercury that was lost in the early years and now resides somewhere outside the creek system for the most part.

Mrs. LLOYD. When do you really think that Union Carbide personnel first recognized we had a possible problem with mercury contamination in East Fork Poplar Creek or Polar Creek, Dr. Richmond, Dr. Auerbach?

Dr. AUERBACH. You asked, Madam Chairman, when did we first begin to suspect——

Mrs. LLOYD [continuing]. That there was a problem of this magnitude.

Dr. AUERBACH. Well, as I indicated in my testimony, we began to suspect there was a problem somewhere in around 1974 when we participated in this preliminary three-plant assessment. That is when we began to be concerned about the sources of mercury in the Poplar Creek system.

Mrs. LLOYD. Dr. Richmond?

Dr. RICHMOND. I would like to add to that somewhat. Earlier today, people referred to the environmental monitoring reports. These are produced by the Nuclear Division for all facilities, not just X-10 as was mentioned by someone earlier. These are widely distributed. I have in front of me one for 1977, which was sent to all the local major press organizations, including Associated Press Knoxville Bureau, Knoxville Journal, Knoxville News Sentinel and other papers, and also EPA region IV.

This particular report essentially summaries the contents of the Elwood report which was discussed earlier. In fact, the report states—I will read a part of it—"As a result of higher than background mercury concentrations in creek sediments and known use of large quantities of mercury at the Y-12 Plant until 1963 * * *" et cetera. The point I am making is that this information was widely distributed within the constraints of national security back in this period of time when they were meeting with TVA and other organizations.

These reports are produced each year and I have a copy of the current one for calendar year 1982, which summarizes the information on the environmental monitoring program for all the Nuclear Division facilities.

Mrs. LLOYD. Thank you.

Dr. Revis, you mention on page 2 of your testimony that mercury has no known physiological function, this means mercury is not a trace element and not necessary of the proper functioning of the human body as other trace elements are.

Dr. REVIS. Most scientists agree that it has no known physiological function. There was a report about 10 years ago indicating a need for it but I think this has been disproven.

Mrs. LLOYD. Dr. D'Itri, would you comment on that, please.

Dr. D'ITRI. I certainly agree. The report he referred to I think was a report by Dr. Goldwater, but to the best of my knowledge, there is nothing in the literature other than that one paper that indicates that there is a possibility that mercury might be an essential nutrient.

Mrs. LLOYD. Would you all agree that no known health hazards now exists?

Dr. D'ITRI. Yes, I would.

Mrs. LLOYD. Thank you very much.

Mr. GORE. Dr. Richmond, you held up those reports a minute ago. Mr. La Grone in this morning's testimony said that it is his perception that—and I do not want to misquote him, but I asked the question whether or not he thought that those reports gave an accurate picture to the public and those who read them of the extent of the problems, and Mr. La Grone responded that it was his perception that indeed they did not.

Would you like to react to that?

Dr. RICHMOND. Yes. I guess any document can be improved on. The intent was to summarize the monitoring information, and incidentally the data for all the NPDES positions are summarized there. The intent is to make this widely available to the press and the private sector so that if there are additional questions this could be a source of information upon which people could generate additional questions. It is kind of a succinct summary rather than a very detailed type report.

Mr. GORE. Do you think it presents a reasonable overview of the problem? Do you think those reports taken as a whole, if I sat down and read through every one of those reports and did not have the benefit of the testimony presented at this hearing today, would I have an accurate view of what the environmental problems were, or an accurate appreciation of what they were?

Dr. RICHMOND. That is perhaps one way that these could be improved, to have an explicit, unambiguous statement of some of the key problem areas that are being addressed. As an example, there has been quite a bit said today about some remedial actions required because of recent interactions with the State and EPA.

One of those kinds of interactions involved the—both the long-term and the short-term solution to the problem. Quite a bit was said so far today about the pollution control facility that has been of interest to many of us for many years. We are also trying to get an interim solution to that problem so that we can essentially stop liquid wastes from Y-12 in a very short timeframe, and I am speaking of the possibility of a month or so.

Now that will require a lot of help from EPA and the State in terms of changing permits and that kind of thing and we hope very much that we will get assistance from the Department of Energy, Environmental Protection Agency, and the State to make these things happen.

Mr. GORE. You have reviewed all of the reports, is that correct?

Dr. RICHMOND. I am almost certain that is true. I cannot be absolutely certain.

Mr. GORE. Now whose decision was it at UCND to keep the Elwood report "Business Confidential"?

Dr. RICHMOND. As I remember the situation, we had reviewed by memo essentially all the information that we intended to have in the 1977 Elwood Report, and it was a recommendation from the

Department—well at the time ORO, to have the report made Business Confidential.

Mr. GORE. Excuse me, say that again.

Dr. RICHMOND. As I recall the basic recommendation to have the report Business Confidential was made by the staff at ORO.

Mr. GORE. The Operations Office at DOE?

Dr. RICHMOND. Yes, sir.

Mr. GORE. Who there was responsible for that?

Dr. RICHMOND. I am not exactly certain. There were discussions with people from Union Carbide Nuclear Division, Environmental Sciences staff and others, and I believe but I am not certain, that it was made by the environmental—responsible people of the environmental programs in ORO

Mr. GORE. The Environmental Division of ORO?

Dr. RICHMOND. That is correct.

Mr. GORE. Now you at Oak Ridge National Laboratory were not given a 1977 inventory report; is that correct?

Dr. RICHMOND. No.

Mr. GORE. You were not?

Dr. RICHMOND. No.

Mr. GORE. And you were not aware of the 1977 inventory report, is that correct?

Dr. RICHMOND. That is correct.

Mr. GORE. Well, that was a key bit of information, was it not, if one was setting out to conduct an environmental assessment? Dr. Auerbach?

Dr. RICHMOND. I am sorry. Yes, the 1977 Department of Energy Report which was previously classified—is that the report you are referring to?

Mr. GORE. Yes.

Dr. RICHMOND. No, we were not aware of the contents of that report in that period of time. I am speaking for myself.

Mr. GORE. You know, I have the feeling, listening to all this, that the need for confidentiality in the weapons program sort of bled over into an assertion of that confidentiality into areas where it was maybe just more convenient to do it but really the kind of attitude toward confidentiality was part of the environment, part of the decisionmaking environment that led up to this sequence of events. Is that—am I on the right track there, is that part of it?

Dr. RICHMOND. Oh, I guess that is one interpretation. I would add several items that I do not think have been brought up yet today; it was not as I recall until 1978 that the States had any involvement with Federal facilities, and that was during the previous administration.

So up to that point in time, that kind of constraint plus the Atomic Energy exemptions which were discussed this morning, sort of had a different situation in Federal facilities and how they interacted with organizations, regulatory organizations and other kinds of industries.

Mr. GORE. OK. Well, in summary, I guess I am concerned that you folks at the Oak Ridge National Laboratory were asked to give an environmental assessment report and were not told by DOE that there was a spill of 2.4 million pounds. So I guess, in looking at those reports, we have to take into account the fact that you were not told about the inventory and the 2.4 million pounds.

Now very, very briefly because we are running late on time. Dr. Revis, you used in your studies figures of 60 to 70 parts per million, when some areas contain up to 480 parts per million. Is that a significant difference or would you expect to find the same effect with 480 as with 60 to 70?

Dr. REVIS. It is a big difference and it would depend on a lot of things. For example, the absorption of mercury to the gastrointestinal tract is influenced, for example, by selenium. Thus the level of selenium in the soil would be an important fact. Other constituents of soil may affect the absorption and thus the amount absorbed would be reduced or increased depending on the constituents of the soil. But the difference may affect the amounts of mercury which is absorbed; for example, we may see effects on the liver and kidney at higher concentrations of oil mercury.

Again I would like to add one point here, the mercury that was released, as I understand it, was elemental mercury. The amount of mercury that can be absorbed from the gastrointestinal tract is about 0.1 percent, a very small percent. However, in the soil, if you get the conversion of elemental mercury to the inorganic salts you may also get the organic forms.

We did not find a high level, that is relative to the total amount of mercury, of the organic form and we do not know if the inorganic forms are, we only know the total amount of mercury, we do not know again the difference between the various forms.

Mr. GORE. OK. One more question and a very brief response, Dr. D'Itri, because we are running overtime. A lot of people look at this mercury spill and some people think about, you know, the problems that occurred around the world in the past. You are very familiar with the problem at Minamata, Japan. Can you distinguish for me the kind of compounds involved in the two instances?

Dr. D'ITRI. There is no comparison at all. What happened in Japan between say 1954 and 1959 and again in Niigata, as Dr. Revis said, was a case where methylmercury was being produced in a factory as an unknown side reaction to a chemical process.

Then when they washed the product and released the wash water into the bay, they were releasing methylmercury directly, it was a direct release of methylmercury. The concentrations were much, much higher. They estimated 40 to 50 parts per million were probably the concentration range in the organisms in Minamata. So there is a different type of exposure and it just simply does not apply.

Mr. GORE. It does not apply. Now elemental mercury can be converted into methylmercury very slowly by bacteria and in some cases very rapidly by bioconcentration in larger organisms, but the kinds of mercury compounds involved here are so distinguishable from the incident that occurred at Minamata that it is impossible to compare them.

Dr. D'ITRI. Yes. And I throw in one more situation and that is the Iraqi episode that occurred in 1971-72. That was totally different. Again, it was methylmercury but it was methylmercury that had been applied as a seed dressing to seeds and the poor farmers there rather than plant the seed washed them and ate them and so they got methylmercury, but again the concentrations were much, much, much higher. They do not compare to this situation.

Mr. GORE. All right, let me thank all of you very much for your testimony today. Thank you very much.

We are running behind schedule, terribly behind schedule, but we want to call our second panel now, and I would like to ask them to come to the witness table: Ed Slavin, editor of the Appalachian Observer; Dr. Stephen Gough; Mr. James Fuzzell, chairperson of the Client Council; Mr. Terry Weaver, president of the Oak Ridge Chapter of the NAACP, and Mr. Dean Rivkin, board member of the Legal Environmental Assistance Foundation at the University of Tennessee College of Law.

If you gentlemen could work your way to the witness table, we would appreciate it.

Is Mr. Terry Weaver in the audience? We would like him to come to the witness stand.

[No response.]

Mr. GORE. Well, we will proceed with those we have at the table. Gentlemen, if you could rise and raise your right hand.

[Witnesses sworn.]

Mr. GORE. Thank you very much.

Without objection, the entire text of the statements you have presented will be in full in the record, so that if you have additional statements which you wish to add, please feel free to give them to the subcommittee for possible inclusion in the record, as well.

We are running short on time. I apologize to you in advance for that fact. And I would request, as we have with other witnesses in earlier panels, that if you can summarize some portions of your statement, we would deeply appreciate it.

Mr. Slavin, you are editor of the Appalachian Observer. You have been an active participant in these matters and we would like to hear from you first. Please proceed.

STATEMENT OF EDWARD A. SLAVIN, JR., EDITOR, THE APPALACHIAN OBSERVER

Mr. SLAVIN. Thank you, sir.

Getting the information about the moral outrage of the 2.4-million pound mercury spill for the people of Oak Ridge and Anderson County has not been an easy task.

At the Appalachian Observer, we asked the Department of Energy way back on November 24, 1982, for declassification of all classified documents on mercury spills in Oak Ridge. We asked for the data as soon as humanly possible because we felt the public interest demanded it. It was not until 175 days later, on May 17, 1982, that our FOIA request was complied with and the information finally released to the public.

During this time, our characterizing the situation as a "potential environmental health disaster" was churlishly chided as "alarmist language" by DOE Information Director Wayne Range. The fact is, Mr. Chairman, Madam Chairman, our urgent FOIA request was mindlessly allowed to languish for 6 months, possibly as part of what has been alleged to be a coverup conspiracy involving DOE and Union Carbide.

When told of this delay, DOE's new Operations Manager, Joe La Grone, commendably stated it was inexcusable and "not the way I operate." Mr. La Grone has also warned DOE bureaucrats about their "bunker mentality" and resulting needless drive for secrecy. I think Mr. La Grone's vision is refreshing. I think perhaps we need to look at the roots and just why it was that all this information was kept secret and why it was the people in the communities around East Fork Poplar Creek were never informed.

I think that one critical factor in the failure to warn affected populations about the mercury and other serious toxic pollutants may have been widespread racism in the controlling business, government and power structure in Oak Ridge and Anderson County. The community of Scarboro is an all-black community, or nearly all-black community, which began as a segregated community by design of the Federal Government. That is the first community where these wastes from the Y-12 plant go in East Fork Poplar Creek.

I think a thorough investigation is needed by this committee, using subpena duces tecum if necessary, to obtain all documents from the 1950's about why Scarboro was placed where it was placed and why people from Scarboro and other residents along EFPC were not warned about mercury, heavy metals, acids, bases, and radioactivity.

Moving along, not wanting to duplicate anything anyone else has said, I would simply point out that the handling of radioactive wastes at Oak Ridge National Laboratory is also a concern, and Dr. Alvin Weinberg, the Director of the lab in its early days, said that the methods used were primitive. What they did was to take plutonium and uranium and other toxic and radioactive materials and just put them in the ground in places where water stood in pits. And they have still been doing that recently.

Just to sum up with some conclusions and recommendations based on my stories for the past 9 months, I would like to say that the Government and its contractor—the self-regulation system has been a perverse model of failure. Repeated acts of polluting the environment, including the workplace environment, the DOE reservation, the city of Oak Ridge and its environs, have shown that DOE and Union Carbide are not fully competent to cope with environmental problems. They should no longer be trusted with making vital decisions on an unregulated or "trust me" regulation basis where matters of public health protection and the environment are concerned.

The Government and Union Carbide have not yet apologized for what they have done to the environment and people of Oak Ridge and in Anderson and Roane Counties. Every possible excuse has been put forth: national security made us do it; those bad Soviets made us do it; we were in a hurry to produce badly needed thermonuclear weapons; somebody forgot to turn a valve, so we lost 50 tons of mercury in 1 day in 1966 after the lithium and mercury processes were no longer used; we lost all the documents on radioactive wastes, including plutonium, which were dumped in a watershed area of a Clinch River tributary; they all burned up.

Some cynics say that waiting for DOE officials to try to explain missing documents by saying, "My dog ate my homework." Others suggest a new DOE motto for the Oak Ridge Federal Building carved in marble, perhaps: we forgot, we lost it, we were in a hurry—check one.

Quite frankly, the range of explanations suggests some DOE or Union Carbide public relations genius sat down with a basic criminal law textbook some afternoon, read a chapter on justification and excuse, and went hog wild thinking up examples of ignorance, mistake, necessity, public duty, or duress.

This sort of excuse-making bunker mentality led the writer to rhetorically ask of DOE at Oak Ridge City Council: "Does being DOE mean never having to say you're sorry?" and, "If the Soviet Union dropped 2.4 million pounds of mercury all over Oak Ridge, would that not be considered an act of war?"

There is indeed a crisis of confidence in and around Oak Ridge as a result of the coverup by big government and big business. As Oak Ridger newspaper editor Dick Smyser recently editorialized,

> Instead of making this information public, they consciously suppressed it. The decision to suppress was not just reprehensible; it was stupid. And when the public finds out that it has been deliberately denied information by some presumptive protector, it does not like it one bit and looks with justifiably skeptical eye at not just the specific information in question but at the whole total integrity and intelligence of those who have presumed to keep it uninformed in the past.

I would also conclude that there is probable cause to believe that criminal acts have occurred including misdemeanor violations of the Tennessee Water Quality Act and criminal violations of Federal water pollution laws. Corners were cut in producing nuclear weapons and nuclear power research in ways which put human lives and the environment at risk.

A good case can be made that Union Carbide and U.S. Atomic Energy Commission and its successors displayed, in criminological terms, a criminaloid personality. As described by scholar Edward Ross in 1907, the essence of criminaloid is moral insensibility.

> Nature has not foredoomed them to evil by a double dose of lust, cruelty, greed or jealousy,

Ross said:

> They are not degenerates tormented by monstrous cravings. They want nothing more than what we all want: Money, power, consideration—in a word, success; but they are in a hurry and they are not at all particular as to the means.

Mr. Chairman, I believe that we could infer criminal intent from, among others, the following acts: Repeated false statements of no environmental problems; possible falsification of data by filtering water samples before testing for mercury; suppression of the 1977 ERDA report on 2.4 million pounds of mercury losses; failure to warn affected population groups; failure to take reasonable care with lethal mercury after the mercury/lithium process was abandoned, including a massive 50-ton spill 1 day in 1966 which I describe in my statement, and a failure to drain all this equipment until 1977; failure to properly consider that mercury under Y-12 buildings would stay there and completely ignoring the possibility of underground migration in the only contemporary investigation of any mercury losses; misrepresentations to Tennessee Valley Authority officials; failure to obtain toxic waste dump and NPDES permits; failure to seek all possible information on the interactive effect of DOE's pollutants on human health, including what could happen when you mix human beings and mercury, PCB's, uranium, thorium, plutonium, acids and heavy metals in the same stream.

Probable violations of criminal law have been committed. Will they be investigated? Will indictments be handed up? Will people be prosecuted and imprisoned for their antisocial behavior? Or will the combined might of national security rhetoric, bomb builder influence and the implications of crimes or possible crimes involving the U.S. Government and a multinational corporation named Union Carbide, number 27 on the Fortune 500—will that combined might result in the absence of justice? Will this case be fixed? That depends on what happens next.

My recommendations are as several others have recommended; for cleanup, for strong research and investigation. And I would add that the FBI needs to be involved and also the U.S. attorney and the Land and Natural Resources and Criminal Divisions of the Justice Department. To assure objectivity, DOE and Union Carbide personnel, particularly those responsible for key pollution and coverup decisions, should be involved in this phase as little as possible, except as persons to interview for information.

I would also urge disclosure, including open-shelf access, to all documents on DOE pollution at Oak Ridge, an open-shelf system like they have at the SEC for corporate disclosure in Washington.

I would urge that criminal prosecution be undertaken. I would urge that legislative changes be made to assure that we no longer have a case of a Government contractor being allowed to monitor its own environmental performance. I believe, as the Bible tells us, a man cannot serve two masters. Neither can we expect a polluter to be his own monitor.

And, finally, I think there may be need for public protest. As we editorialized on April 6:

> Somehow in our cynicism, we are used to private, multinational, monopolistic chemical companies putting dollars ahead of people. This, however, is a case of toxic water pollution of our own U.S. Government, a development which would make our Founding Fathers, like Jefferson and Madison, sick at heart.
>
> As U.S. Representative Al Gore, Jr. has said, only public protest can bring about the needed action on toxic chemical waste dumps. What is it going to take for the DOE to get the message? 100,000 people on the lawn of the Oak Ridge Federal Building protesting a potential Government-caused ripple of death? You tell us, DOE. The ball is clearly in your court.

[The prepared statement of Mr. Slavin follows:]

APPALACHIAN observer

121 Leinart Street Clinton, Tennessee 37716

(short)

DRAFT

Prepared Statement of Edward A. Slavin, Jr.
Editor, Appalachian Observer
Before the Subcommittee on Investigations and Oversight
And the Subcommittee on Energy Research and Production,
Committee on Science and Technology
U.S. House of Representatives

Hearing on Oak Ridge Nuclear Plant Environmental Pollution

Oak Ridge, Tennessee
July 11, 1983

Chairman Lloyd, Chairman Gore, Members of the Science and Technology Committee, ladies and gentlemen:

I appreciate the opportunity to testify today, and thank you for this honor. I hope that I will be helpful to your efforts with an exposition of the very serious facts of Oak Ridge environmental pollution, the coverup conspiracy which spanned many years and my thoughts on the need for cleanup, investigation, criminal prosecution, and corrective legislation.

Introduction

Let's start by asking some basic questions:

What happened here?

What have our government and a long-time government nuclear contractor, Union Carbide, done to the people and environment of Oak Ridge and Anderson and Roane Counties, Tennessee?

Why did it happen?

What do we do now?

Mercury Spills and Losses at Y-12

What happened, as revealed by the Appalachian Observer's investigation over the past 9 months, was that the Department of Energy, predecessor agencies and Union Carbide Nuclear Division have polluted East Tennessee's water, land and air under cover of "National Security" rationalization and sophistry. They have committed possible criminal violations of U.S. and Tennessee laws___/, with little meaningful accountability to any other governmental entity until a March 8, 1983 Notice of Non-Compliance to the Y-12 Plant from the State Division of Water Quality.____/

We have seen what has been classed by experts as probably the biggest pollution by toxic mercury in the history of this frail planet. That pollution, involving fully 2.4 million pounds of mercury, did not occur in one accident or incident, as previously asserted by DOE; it occured daily and continuously over a period of 33 years.____/

Even today, by DOE's own admission, some two ounces of mercury per day are entering East Fork Poplar Creek from the DOE Reservation.

This is only the diminishing end of an enormous wave of massive mercury pollution at the Y-12 nuclear weaponry plant. For most of that time vital information about the full extent (and even the existence) of mercury pollution has been marked as secret or "CLASSIFIED" and kept from the people and the press. Dick Smyser, Oak Ridger newspaper editor, recently termed this data withholding "reprehensible"and"stupid."____/

Recently, the mercury losses of the past merged with today's news as the Appalachian Observer won declassification May 17,1983 of a 1977 ERDA report showing that 2.4 million pounds of mercury were spilled,.__/ Little over a month later, on June 22, 1983, in an announced "accident" some 1 to 1.5 million gallons of water spilled out of a broken pipe, flushing long-ago spilled mercury out of building foundations and basements and into the East Fork Poplar Creek, which winds through Oak Ridge, in concentrations as high as 99 parts per billion -- almost exactly 5o times EPA standards.____/

During 1955-59, an estimated 1/2 million pounds of elemental mercury was mindlessly dumped into East Fork Poplar Creek by the Union Carbide-operated, government-owned Y-12 nuclear weaponry plant. DOE still can'tsay what the dose would have been to the adults and children playing and wading and fishing in that creek.__ DOE's water tests for mercury, over a period of some 2o years were scientifically questionable.

DOE's predecessors,the Atomic Energy Commission and the Energy Research and Development Administration, filtered water first, before analyzing mercury levels. Since mercury normally attaches itself to supsended soids in water, most of those suspended solids and most of the mercury would stay in the laboratory's filter paper. Aubrey D. McKinney, Assistant Basin Manager for the Tennessee

Division of Water Management, says that mercury levels may have been underestimated, with levels incorectly stated as 1/20 to 1/30 actual levels._____/

Was this filter paper trick a form of falsification of data to underestimate mercury spils and thereby keep the government's -- and Union Carbide's-- mercury pollution actions secret? No one is just sure yet. Further investigation is needed of this and other elements of what may be a massive coverup in violation of criminal laws, perhaps rivalling Watergate and Teapot Dome.

Worker Exposure

Workers inhaled this mercury, too, and thorough and independent epidemiological studies of their health is needed to come to grips with the full impact of the 2.4 million pounds of mercury losses. The declassified 1977 ERDA study, released May 17 1983 in response to the Appalachian Observer's November 24, 1977 Freedom of Information request, shows that fully 30,000 pounds of mercury were emitted into the air outside Y-12 Plant. The amount of mercury which remained inside the plant for workers to breathe has not been disclosed.

Experts believe that the lung pathway to the body is probably the most deadly and damaging one for mercury poisoning. As the SCEP (Study of Critical Environmental Problems) report documented in 1970:

> Elemental mercury and most compounds of mercury are protoplasmic poisons and therefore may be lethal to all forms of living matter. In general, the organic mercury compounds are more toxic than mercury vapor or the inorganic compounds. Even small amounts of mercury vapor or many mercury compounds can produce mercury intoxication when inhaled by man. Acute mercury poisoning, which can be fatal or cause permanent damage to the nervous system, has resulted from inhalation of 1200 to 8500 micrograms per cubic meter of mercury. The more chronic poisoning (mercurialism) which also affects the nervous system is an insidious form in which the patient may exhibit no well-defined symptoms for mnths or sometimes yearsafter exposure._____/

> ....Because of its high vapor pressure at room temperature, exposed mercury constantly emits vapors into the air.

The *Appalachian Observer* has located at least one suffering former Y-12 worker who breathed that mercury into his lungs during the 1950's, when mercury was used in an all-out effort to process lithium needed in manufacture of hydrogen bombs. James C. Wilson, Jr. of the Beech Grove community in Anderson County has been diagnosed by Vanderbilt University Hospital physicians in Nashville as having mercury poisoning, ataxia, a jaw twitch, permanent damage to the left side of his brain, loss of vision and "technicolor" hallucinations, and serious digestive system problems causing frequent vomitting.

Information from Mr. Wilson and others suggests that a large level of mercury vapors was present in the Y-12 Alpha 4 Building. Further epidemiological investigation of Y-12 mercury workers would appear necessary. Mercury victim Wilson's experience shows that Union Carbide fought hard to deny Wilson a paltry $10,000 claim for workmen's compensation benefits and made materially false and misleading statements to the press -- that there had "never" been any such claims or lawsuits filed by mercury poisoning victims.

Mercury-Contaminated Schoolyards

Mercury-contaminated fill dirt from East Fork Poplar Creek was used in construction projects around the City of Oak RIdge for years. No one ever warned about the contamination, which was treated as a state secret. Tests by Oak Ridge Associated Universities and the firm of Stewart Laboratories now reveal that mercury levels in Oak Ridge soil tested thus far are among the highest levels of mercury found in soil in the United States.

Children at the elite City of Oak Ridge's two junior high schools-- perhaps including the very children of the DOE and Union Carbide officials responsible for mercury pollution -- have been exposed to serious levels of mercury in their schoolyards and ballfields. Some of this mercury washed up from East Fork Poplar Creek onto the Robertsville Junior High School playing fields. At Jefferson Junior High School this mercury was deposited on top of a sewage ditch in the form of fill dirt taken from East Fork Poplar Creek dredge material.

No Warnings

Nobody ever warned the chilrden or administrators at those schools about mercury contamination. No one gave workers at Y-12 warnings about mercury exposure during the 1950's and 1960's. Until 1982,no one ever warned people about fishing and wading in East Fork Poplar Creek, which leaves the Y-12 plant, winding through the once-segregated Scarboro black community and then goes onto the West End of Oak Ridge.

Just these few examples suggest that the United States Government the Union Carbide Nuclear Division have needlessly subjected thousands of innocent and unwarned citizens to potential environmental health diseases and death.

Lack of Cooperation With Press

Getting the information on this moral outrage for the people of Oak Ridge and Anderson Couty has not been an easy task: we at the Appalachian Observer had asked the U.S. Department of Energy on November 24, 1982 for declassification of all classified documents on mercury spills in Oak Ridge. We asked for the data "as soon as humanly possible," because we felt the public interest demanded it. It was not until fully 175 days later -- on May 17,1982 -- that our Freedom of Information Act request was complied with and the information finally released to the public. ____/

During this time, our characterizing the situation as "a potential environmental health disaster" was churlishly chided as "alarmist language" by DOE information director Wayne Range. ____/

Our urgent FOIA request was mindlessly allowed to languish for six months as a possible part of an alleged, continuing coverup in which the Government and its nuclear contractor have participated.

When told of the delay, DOE's new Oak Ridge Operations Manager Joe LaCrone stated it was "inexcusable" and "not the way I operate."____/ LaGrone has also warned DOE bureaucrats about their "bunker mentality" and resulting needlessdrive for secrecy. La Grone's vision is a refreshing change in Oak Ridge, as is his call for "openness and candor," as postulated before Oak Ridge City Council May 23.____/

Other Pollutants

Mr. LaGrone and his staff, and Members of Congress and their staffs would have their hands full if the Y-12 mercury pollution were the only environmental problem ever created by the U.S. Government operations in the City of Oak Ridge.

But Y-12 Plant is seriously out of compliance with the Tennessee Water Quality Control Act of 1971 through numerous instances of toxic,serious and illegal pollution of surface and groundwaters.

Among the pollutants, besides mercury, emitted into Bear Creek and East Fork Poplar Creek and adjacent groundwater by the Y-12 nuclear weaponry plant are the following: polychlorinated biphenols(PCB's), uranium, thorium, plutonium, nitric acid, cyanide, hydrochloric acid, hydrofluoric acid, lead, cadmium, methlyene chloride, beryllium, halogenated and non-halogenated solvents and stripping, cleaning and plating solutions and solvents containing heavy metals. There's even acidic coal pile runoff which would likely violate Office of Surface Mining standards if Y-12 were a coal mine.____/

High Levels of Heavy Metals, Toxics in Groundwater

Additionally, as reported by Carolyn Shoulders in the Nashville Tennessean, groundwater pollution by heavy metals and some toxics is already from dozens to tens of thousands of times higher than acceptable EPA standards for drinking water. As Ms. Shoulders recently wrote:

> The highest levels on each of these substances show:
> Cadmium levels up to 87.5 times the drinking water standard.
> Uranium levels up to 279 times the EPA suggested goalr
> Methylene chloride levels up to 137 times the EPA guideline.
> Perchloroethylene levels up to 35,000 times the EPA guideline.
> Lead levels 53 times beyond the EPA drinking water standard. _____/

Ms. Shoulders also wrote that State Water Quality Division scientist Barry Sulkin

> said the state requested the DOE information on groundwater because it became obvious to the Department of Health and Environment that some material was seeping into the ground rather than the creeks.
> If we were to find there was not ground water contamination around some of the [DOE Y-12]dump areas, then the problem could be confined and perhaps it could be cleaned up before it reached the groundwater, Sulkin said.
> The fact that it is already in the ground means the problem has already spread beyond the pits. It's very likely that it's not possible to clean up ground water._____/

Notice of Non-Compliance Unannounced

In light of the ensuing furor and press attention to the illegal pollution from the giant Oak Ridge nuclear bomb-building facility, it is particularly ironic to note that the March 8, 1983 Notice of Non-Compliance was announced by neither the State of Tennessee or the Department of Energy. Only after the Observer detected the citation nearly a month later did the problems receive publicity.

Even beyond public health, problems involve the need for possible large expenditures of tax monies, and partly flow from loss of 2.4 million pounds of mercury, which the Oak Ridger newspaper has reported was and is worth $7.2 million.

"The Industrial Ditch"

At the Y-12 Plant, ignorance and contempt for the environment among bomb-builders took the form of Union Carbide officialdom and workers using the term "The Industrial Ditch" in referring to the headwaters of a creek flowing through one of Tennessee's largest cities (East Fork Poplar Creek), which creek, like Bear Creek, begins on the DOE Reservation at Y-12.

As Tennessee water pollution officials found in March:

> - "There are numerous pipes discharging" into East Fork Poplar Creek (EFPC), including some "50 to 1oo discharge pipes into the Upper EFPC.
> - East Fork Poplar Creek "contained a signficant solids burden and available information and observations indicate this [upper Y-12] stream segment to be devoid of aquatic life. A large pipe on the north shore was discharging, and as we watched, the flow characteristics, including

> volume, color and odor changed significantly, indicating a batch discharge. This discharge was sampled and identified as 'building 9995 drain.' All disharges into the waters of the State must be under a permit. There are perhaps 5o to 100 discharge pipes into upper EFPC. None of these discharges have permits.
>
> • At its headwters near the Y-12 coalpile on the northwestern slopes of Chestnut Ridge, East Fork Poplar Creek is considered'waters of the State of Tennessee'-- pollution of which violates state law. The Division of Water Quality says "the "...upper reaches of the stream are underground and emerge into what is sometimes called 'the industrial ditch' by DOE and Y-12 personnel. From this point down stream to New Hope Pond there are numerous pipes discharging [into] the stream. Where the stream is underground, there are numerous....untreated discharges includ[ing] rinse water from the main metal plating lab, lab drains, laundry waste, mop water, cooling water, residual mercury from past spills, coalpile runoff and other identified wastes." _____/

For decades in the 1950's and early 1960's, plant personnel saw mercury flow into the industrial ditch. One former Y-12 worker (and county commissioner) told me that he even took an eye dropper and removed mercury out of the industrial ditch as a workaday curiosity..___/

No one even mildly cared about the 'Industrial Ditch being chock-full of poisons until the late 1950's and early 1960 's, when the optomistically named "New Hope Pond" was conceived, designed and built in a desperate Carbide/Government effort to "dilute" poisons flowing into the same creek where children and adults played, waded, swam and caught minnows, turtles and frogs downstream.

The Pond does not meet EPA primary and secondary water treatment standards -- standards rigorously applied to non-government facilities in recent years.___/

Downstream, children growing up in the City of Oak Ridge sometimes used the term "ChartreuseCreek" ____/ to describe East Fork Poplar Creek and other waterways. Children still played in the creeks, for nobody posted warning signs until last fall, when that action was taken by the Tennessee Department of Public Health and Tennessee Wildlife Resources Agency.

DOE opposed the placing of warning signs on East Fork Poplar Creek, denying there was even a potential for problem wen 87% of the fish caught there turned up with mercury levels in excess of Food and Drug Administration "action levels." ____/

DOE Says It Killed Stream, Created It

By way of a possible excuse for not wanting to disclose estimates of 1955-59 EFPC mercury levels and human dosages, DOE's Oak Ridge Assistant Manager Joe Lenhard told the *Appalachian Observer* June 24 that EFPC "was essentially dead" during that time. Lenhard said that until the New Hope Pond was built, "there wasn't a living thing in that stream."

Lenhard further said, when asked for mercury levels in fish and turtles people might have eaten during 1955-9, "there weren't any fish in that stream." Lenhard asserts "it wasn't even a stream until" the Atomic Energy Commission came along, putting up to 2o million gallons of water a day into "that little valley" where previously there was only "a small, little branch... like a wet weather spring."

This may be a good excuse for not having historic data on mercury in fish, but it provides little in the way of exculpatory evidence for DOE's actions, and those of its predecessors. Quite the contrary, it is in legal terms an "admission against interest" or "res gestae."

Dilution Pollution Solution Questionable

In 1963, the optomistically named New Hope Pond was completed, catching the Y-12 nuclear weaponry plant's waste water, contaminated with mercury, uranium, PCB's and acids. The contamination has been diluted with as many as 20 million gallons of water per day. That is the sole treatment: dilution is the purported solution to pollution from the bomb-building plant! ___/ This is so absurd some think it might have been a creation from a Kurt Vonnegut novel -- if only it weren't so real.

New Hope Pond violates all standards imaginable for treatment of industrial toxic wastes. As the Appalachian Observer reported April 6 about the Y-12 Notice of Non-Compliance from the State of Tennessee's Division of Water Quality:

> •New Hope Pond,[is] covered by a National Pollution Discharge Emission System (NPDES) permit which expired over three years ago -- February 15, 1980-- [and] is used to impound the East Fork of Poplar Creek before it leaves Y-12. State water regulators say "this is an unusual permit situation, since in private industry, individual process discharges are treated and monitored for concentration and loading, and dilution is not allowed as a treatment technique." [At] the DOE Y-12 Plant, "The permit parameters do not include all pollutants discharged, nor does it cover any pollutants discharged in sediments, such as mercury, uranium, thorium and PCB's.... New Hope Pond's "unusual permit situation" allows discharge parameters" to be measured "after dilution and in concentration only" with the permit not limiting "pollutants in terms of loading (pounds per day) and thus by design allows dilution in order to meet limits."
>
> • High levels of mercury, uranium, thorium, and PCB's in NewHope Pond have also been found in East Fork Poplar Creek in ORNL [Oak Ridge National Laboratory]'studies.

> - In early years of Oak Ridge, the "most significant discharges of mercury" -- 14.5 miligrams per liter, or 2900 times the Guideline" were made by the Atomic Energy Commission "These discharges were not reported to the Division of Water Quality.
> - "A proposal to clean out" New Hope Pond is needed "immediately," [state officials found.]

Racism A Factor?

One critical factor in the failure to warn of mercury and other toxic pollutions in the areas of EFPC may be widespread racism in the controlling business-government power structure in Oak Ridge and Anderson County.

The nearly all-black community of Scarboro is the first populated place where Y-12's wastes reach from New Hope Pond travelling via EFPC. As University of Tennessee historians Charles W. Johnson and Charles O. Jackson wrote in City Behind a Fence: Oak Ridge, Tennessee 1942-1946:

> In any event, it was anticipated that all Oak Ridge blacks would reside in Scarboro, which indeed they did until the late fifties and early sixties. Scarboro was begun in 1948 and first opened to residents in 1950, at which point 15 cinder-block family units, 143 frame duplexes and 7 dormitories became available for occupancy.

The U.S. Civil Rights Commission has hit DOE/Carbide hiring. Union Carbide Nuclear Division has had large, out-of-court settlements in race and sex discrimination cases ___/, and many of the top and middle-management officials in both Union Carbide and the government's Oak Ridge Operations headquarters belong to the 1200 member Oak Ridge Benevolent and Protective Order of the Elks Lodge, which has no black members and bars blacks from bar and eating facilities (outside catered events for outsiders).

Elsewhere in the city and county dominated by Union Carbide and DOE executives, racism is an institutional force:

- there hasn't been a single black Oak Ridge policeman in eight years.___/
- blacks are notoriously under-represented on local juries. ___/
- the Equal Employment Opportunity Commission is invetigating possible racially discriminatory hiring practices in Anderson County government, the Courthouse of which (until recently) had not one single black working in it. ____/
- a local Circuit Judge and Y-12 alumnus once termed a black defendant "a black subject" and condescendingly referred to his black female lawyer as "a credit to her race." ___/
- the 1958 bombing destruction of Clinton High School was never solved, with no indictments brought despite FBI investigations that fill some 6600 pages of documents. ___/

As one can see, there is plenty of racism around for inferences about why DOE officials and their predecessors a) put all blacks in Scarboro and b) didn't warn Scarboro and other residents about mercury, heavy metals, acids, bases and radioactivity emitted into EFPC from Y-12.

Use of subpoena power may be needed to get all documents relevant to the selection of Scarboro as the segregated black neighborhood and the failure to warn those residents of pollution. Further investigation is in the national interest, as any detectable or inferrable impact of race on the unannounced release of toxic mercury into a community's creek would be so far from stated public policy goals as to shock the conscience. If such racist influence on on Oak Ridge pollution practices and their coverup could be successfully proved and argued in court, punitive damages would be in order.____/

In light of all the evidence.(including ethnocentric officials like DOE environmental protection director Jerry Wing's down-playing the prevalence of fishing)in Oak Ridge), strong inferences may be drawn that top DOE/Union Carbide officials didn't care much about blaks, or didn't start caring until DOE recently got a new Oak RIdge Operations Manager, Mr. Joe LaGrone.

COVERUP CONSPIRACY?

As S. David Freeman, a respected Director of the Tennessee Valley Authority has stated to reporter Libby Wann of the Chattanooga Times, "there has been a damned coverup at Oak Ridge" with respect to the mercury situation and related environmental pollution problems. As Director Freeman said, "somebody ought to get to the bottom of it." Freeman and others have said ERDA officials mislead, and mislead TVA intentionally about the extent of mercury pollution in EFPC, never disclosing all information then available in response to TVA's requests.

Using the mercury situation as a synecdoche-- a part portraying the whole Oak Ridge/DOE/Union Carbide environmental problem -- let us look at the mercury coverup, which some would term a criminal conspiracy, and which is right now under investigation by a Criminal Investigator from the DOE Inspector General's office.

As the Appalachian Observer reported in a June 8 News Analysis:

> • DOE's predecessor, ERDA (Energy Research and Development Administration) concealed mercury data from the Tennessee Valley Authority - at a time when ERDA purported to be laying all the cards on the table.

> - Never was TVA, the press or the public informed of the spillage, dumping and leaking of 2.4 million pounds of mercury at Y-12 during 1970-1977-- until May 17, 1983. That was only after a half-year's delay to the Appalachian Observer's November 24, 1982 FOIA request, which ended the historic "classification" of the dirty secret about Y-12 mercury pollution.
> - Oak Ridge National Laboratory allegedly used peer pressure and supervisory pressure tactics to rid itself of whistleblower Dr. Steve Gough, who took "unauthorized" samples of sediment showing high levels of mercury in East Fork Poplar Creek sediment.
> - In 1977, DOE Environmental Director Jerry Wing severely restricted distribution of a toxic mercury study involving Oak Ridge creeks, saying "the situation is quite sensitive from a public relations standpoint" and requiring the information be classed as "Business Confidential." ____/

. In an action which the County Attorney (civil attorney)for Anderson County termed "Ethnocentric," ___/ DOE Environmental Protection Director Jerry

> Wing dismissed the possibility that anyone would eat fish from Oak Ridge creeks, saying "Oak Ridge is probably not a city of numerous intensive sports fishermen" since it is "a relatively affluent city for East Tennessee, a city characteristically populated by scientists and engineers (who have other life pursuits than habitual sports fishing) it seems conservatively quite reasonable to conclude that not even half of the 30,000 population might be sports fishermen or eat sports fish to any notable degree.

In sharp contrast, the U.S. Tennessee Valley Authority is very concerned about mercury pollution of the rivers and streams it was charged in 1933 to manage and husband for all America. TVA's Ralph Brooks, Assistant Director of the TVA Environmental Quality Branch for Air and Water Management, says TVA wants all toxic mercury in its reservoirs cleaned up, including any of Y-12's mercury which might be in the Watts Bar Lake downstream on the

Tennessee River.____/ Reportedly, a recent request by a private firm for a commercial fishery permit on Watts Bar Lake was turned down due to mercury pollution concerns._____/

- A.K. Bissell, the well-regarded former Mayor of Oak Ridge, recently told Knoxville News Sentinel reporter David Lyons openly what too many Oak Ridgers harbor inwardly -- that he had knowledge of mercury spills and losses as a Y-12 accountant but considered them unimportant. Mayor Bissell's words exemplify the views of many in the city he loves: "We lost it 27 years ago and the press is just now finding out. Hell, ain't dangerous unless you drink it, and I don't plan on drinking any mercury." ___/ Mayor Bissell told The New York Times:

> that most Oak Ridgers had not mentioned the reports of mercury spills to him and that he suspected that this was because, being people of science, they are reasonable people who wait to hear all the facts and believe that all things are solvable.
>
> "We believe here that the dumber you are, the better critic you make," said the Mayor.____/

With an Oak Ridge City Council and Anderson County Commission heavily dominated by Union Carbide employees (often promoted through political patronage networks upon their election or even their candidacy), there was little in the way of countervailing powers from anywhere in local government. Today, Anderson County Attorney David A. Stuart speaks to the cover-up from the vantage point of one who has the power to file a public nuisance lawsuit and get an injunction against Union Carbide for what it has been doing all these years. He told the Chattanooga Times DOE has "committed continuous violations for 3o to 4o years. "It's outrageous. It's morally wrong. It's legally wrong."

Stuart told the Appalachian Observer that he has reviewed DOE documents and is planning a public nuisance lawsuit on behalf of Anderson County residents under provisions of Tennessee law empowering County Attorneys and District Attorneys General to abate public nuisances through litigation. Because DOE feared a "public relations problem," "it and predecessors ERDA and AEC concealed the mercury problem until LaGrone came in as ORO manager: "their main reason for a coverup was to avoid a public relations problem," which DOE now has despite its best efforts to conceal. "I'd be surprised if there isn't something else they've been hiding," the Anderson County Attorney said.

Repeatedly, DOE has boasted that its Oak Ridge Operations pose no problem to man and his environment. To do so requires some fancy logic-chopping, as in April of this year when DOE Oak Ridge information director Wayne Range told the Observer that two wildly contradictory statements in DOE's understated December, 1982 Y-12 Environmental Assessment were due to one considering the DOE Reservation as seperate and apart from the natural environment while the second quote does consider DOE part of the environment! The first statement was that "To date [pollution] releases have not caused any significant impacts on the environment."

Elsewhere in the same report, some DOE environmentalist got to sneak in a sentence or two about what the Y-12 pollution facts really are:

> Impacts on aquatic organisms in the streams of the reservation are significant because of the concentration of some chemicals exceeds the recommended maximum limit for the protection of aquatic biota. The absence of many abundant organisms and the abundance of pollution-tolerant species indicate degraded water quality.___/

DOE admits in its own December environmental report on the nuclear warfare industrial plant that

> Efforts currently underway will improve the quality of the water and may minimize, but not eliminate the adverse effects on aquatic liffe because of other pollution point sources in the area. Past operations have caused measurable concentrtions of heavy metals (e.g. mercury) in sediments of some of the tributary streams and the Clinch River, resulting in elevated levels in fish and macroinvertebrates. These effects will persist for many years." ____/

Not only is DOE in a quandry about what the "environment" is and what sort of shape it's in, DOE may be insensitive about what and were there are "sensitive areas." By way of another DOE statement which could be materially false and misleading, the Y-12 report contains a section on "sensitive areas" :

> III E 5 Sensitive Areas
>
> Since there are no sensitive areas (or scenic rivers) in the proximity of the Y-12 Plant, there is no influence on such areas."

Perhaps DOE's insensitity to life "on the other side of the fence" here in the "Atomic City" is best reflected by DOE Oak Ridge information director Wayne Range's explanation of why the 2.4 million pound mercury spill information was not released years ago:

> There was no particular reason that I know of driving why it should be made public. ...[During the pre-LaGrone days] we knew of no driving reason why it would be pulled and made public.

Why the coverup?

DOE Oak Ridge Manager Joe La Grone told Scarboro residents June 22 that "Individuals either directly or indirectly chose not to deal with the problem." _____/

For years, this lack of coping included:

- never studying the interactive effect of all the Government nuclear installation pollutants entering Oak Ridge streams
- never fencing off Oak Ridge streams, assuming arguendo there was any conceivable national security justification for polluting them in the first place.
- never warning people about using the creek for recreation or fishing
- never warning people and contractors not to use creek sediment removed in dredging as fill dirt all over the City of Oak Ridge.
- never tested a single turtle for mercury until June, 1983, despite the fact some people eat turtle meat, showing again DOE tendencies the Anderson County attorney has termed "ethnocentric."

Because "individuals either directly or indirectly chose not to deal with" a pollution problem of enormous intensity, Oak Ridgers today live in fear as to what might happen to them. Some must undoubtedly feel like they were the unwilling participants in a biological experiment.

While DOE Environmental Protection Director Jerry Wing once said "DOE is not in the mercury monitoring business" (in an effort to get TVA to do it, without telling about the 2.4 million pound mercury loss making it imperative), DOE was plainly in the "mercury pollution business." ____/

In recent days, DOE has placed contracts with Battelle Labs, ORAU and Oak Ridge Research Institute for research on mercury. Some of that research may be questionable -- like the over $25,000 spent at Oak Ridge Research Institute to feed mercury-contaminated sediment to rats, mice and pigeons. The study involved only a 14-day period, and replicated acute toxicity studies widespread in the toxicological literature.____/ Meanwhile, the studies of chronic mercury effects needed to understand symptoms which could affect Oak Ridgers have been left undone.___/

When this writer and the Anderson County Attorney have even suggested that there might be an appearance of impropriety or conflict of interest in "DOE paying money to study DOE's pollution and its effects," DOE officials and one contractor have lost their tempers in public and stated that they felt their integrity was questioned simply because organizational conflict of interest questions were asked of them!

What we have, however, is DOE and Union Caride contracting with members of the DOE-Oak Ridge nuclear industrial and research complex, which is a closely intertwined community of interests whose members may lack the objectivity needed. Oak Ridge is a provincial, small and protective town in many ways.

Denials of any health problems by people who could be subjected to criminal charges and tort liabity if there are health problems is the height of self-serving statement.

Why does DOE still not endorse calling in the U.S. Center for Disease Control and other agencies for an independent health assessment? Is the coverup of the past continuing into the future?

Exploiting National Security

DOE has also sought to exploit for public relations advantage the fact the mercury spills occured during production of thermonuclear weapons while the United States and the Soviet Union were in the thick of the Cold War in the 1950's and early 1960's. People ignored environmental problems out of ignorance or patriotism, the line goes, with Y-12 completing and perfecting the lithium extraction process in two years, which DOE Oak Ridge Assistant Manager for Energy Programs Bill Bibb today brags was a "rather remarkable accomplishment."

In light of all the circumstances, is this a somewhat silly boast best suited for the provincial "Babbit" character in the City of Zenith in Sinclair Lewis's novel?

Oak Ridge technologists and scientists utterly failed to learn their lessons from major spills at lithium technology pilot plants at Oak Ridge National Laboratory in the early 1950's -- spills which quite literally flowed out of the door, DOE now admits. Thousands of pounds of mercury were mindlessly lost, flowing out the plant doors and down into the building foundations there long before the Y-12 spills and losses and pollution started.

There have also been small-scale but significant K-25 spills. A reasonable and prudent man, even given the accelerated demand for nuclear weapons technologies of the Cold War, would likely seek to conserve patriotically U.S. Government property in the form of a toxic and critical material such as mercury. Taxpayers paid for that mercury.

Not only did AEC and Union Carbide fail to learn from the early ORNL development plant spills, they even allowed spills to occur after the mercury/lithium process was no longer used. A 1966 spill of 50 tons of mercury is instructive in that regard, for it was the only spill of mercury at Y-12 to ever result in an investigation, albeit one dominated by the government's contractor, Union Carbide.

50 Ton Spill After Process Was Shut Down

Even after the Cold War had thawed and the era of Detente had begun and the mercury-using lithium extraction facilities at Y-12 were put in mothballs, AEC and Union Carbide failed to take prudent measures to prevent mercury losses.

In 1966, for instance, according to a 1966 AEC report "investigation" by a Union Carbide dominated committee, fully 50 tons -- 100,000 pounds, or 1/24 of all mercury that was ever lost or unaccounted for at Y-1 -- was negligently spilled onto the ground in Y-12 Building 9201-5 the weekend before March 28, 1966, when Union Carbide Nuclear Division's present President, Mr. Roger F. Hibbs, was Y-12 Plant Manager. Mr. Hibbs has never returned this reporter's phone messages with a phone call.

DOE official Bill Bibb has denied there were ever mercury "spills" but as the Appalachian Observer revealed on January 5, 1983:

> Fifty tons of lethal mercury were spilled onto plant floors and into East Tennessee earth as Union Carbide Nuclear Corporation employees neglected their duties to secure a makeshift, taped on plastic tube measuring device at Y-12 nuclear weaponry plant in March, 1966.

Bear in mind that AEC was no longer using the mercury process, there was no longer any mercury polution excuse of Russian competition.

The equipment from which there flowed a 50 ton leak that March weekend in 1966 was jerry-rigged with a primitive method for estimating its contents. That method simply involved opening a valve and taking a reading from a piece of tubing taped to a "site glass" on the side of a giant tank of mercury.

Jerry-Rigged Equipment, Human Error

Because it was hard to read the level of mercury through the site glass, Carbide personnel jerry-rigged a potentially dangerous system for estimating mercury levels:

> An unclassified Y-12 report by the Carbide and DOE employees says the normal procedure for taking inventory in the mercury tanks with a makeshift tube sight-gage was to:
> 1. Open the sight-glass drain valve.
> 2. Let mercury equalize in [attached' plastic sight-gage tube.
> 3. Make mercury level measurement.
> 4. Close sight-glass drain valve.
>
> On March 1, 1966 a Carbide Y-12 foreman forgot step 4 of the makeshift "inventory" procedure using the plastic tubing he "inadvertently omitted" the step "because of an interruption in the sequence" -- the foreman's walking from the mercury tanks after, the committee said, he "decided to return temporarily to his other responsibilities which had no association with mercury. Since at the time he anticipated he would be returning shortly, Mr. [name deleted] neglected to close the sight-gage drain valve isolating the plastic tube sight-gage from the mercury supply. In the interim, since Mr. [deleted] was engaged in executing his other responsibilities, it escaped his memory to return for a new inventory determination and to complete the inventory procedure." In a unsworn statement, the foreman said that because "I was told by a process operator at this time that another pig [large barrel] of mercury would be added shortly to the tanks...[and] Since there was going to be a time interval before the mercury could be transported to the tanks, I left the pit area to attend to my other responsibilities with the intention of returning after the mercury addition. Since my other responsibilities have no association with mercury, it escaped my memory to return to the pit area". On March 16, 1966, a process operator discovered the open sight-glass drain valve, which was not provided with a handwheel for easy turning. The

> worker hunted for a wrench to close the valve, but his foreman directed him to "proceed to another area to clean up the mercury spill," the AEC/Carbide "Investigating Committee" report states. The committee allowed as how the worker "neglected to tell Mr. [deleted] of the open drain valve and then forgot to return to close the valve." Then on Monday, March 28, with there having been no evidence of leakage in a waste pit on the afternoon of Friday, March 25, 1966, a Y-12 worker "noticed that the Dump Pit floor was completely covered with mercury. The depth was determined to be between three to five inches...It was evident that the plastic adhesive tape securing the [makeshift' plastic sight-gage tube to the sight-glass had become detached."

Carbide Investigated Itself

As the Observer reported on January 5th of this year of Union Carbide Nuclear Corporation:

> That corporation was allowed by the U.S. Atomic Energy Commission to conduct its own self-probe of the mercury loss accident, which became the official report of AEC. In a conflict of interest practice since criticized by the U.S. General Accounting Office, the AEC let the very contractor which caused potentially life-and-health-threatening conditions at federal nuclear plants proceed to "investigate" its own employees and the firm's possible mistakes and possible law and contract violations. Naturally, no sanctions against Union Carbide Nuclear Corporation were found by the alleged "investigation." A copy of the Atomic Energy Commission's "Report of investigating Committee [on] Loss of Mercury at the Y-12 Plant," obtained by the Observer under the Freedom of Information Act, reveals the then-Oak Ridge Operations Manager S.R. Sapirie, appointed three Union Carbide Nuclear Corporation employees and an AEC official as the sole members of the "Investigating Committee" [they were W.B. Kenna, Assistant Chief, Nuclear Materials Control Branch, ORO; R.E. Hulme, and H.T. Kite of the Y-12 development division.]

Bad Communications and Toxic Materials Ignorance Found

As the Observer reported January 12th, that investigation blamed bad communications and ignorance about toxic materials handling for the spill:

> "The spill incident is primarily the result of inadequate communications between operating personnel and a failure to follow established operational procedures." The only recommendations the Committee offered were:
> - improve "liason"
> - report discrepancies to supervisors immediately
> - "personnel engaged in processing valuable and toxic materials be thoroughly oriented in regard to their function and responsibilities and the informing their supervisors of system abnormalities."
> - when "temporary equipment" used in process operations involving "valuable material [s], the area should be continously attended until the security of the valuable contents are assured by adequate and acceptable means not of a temporary nature [like taping a plastic hose to a tank, presumably]
> - mercury levels in the building should be monitored and dangerous areas marked "Mask Areas"
> - building drawings should be marked with "appropriate identification to indicate mercury contamination of the sub-soil"

Spill Spread Underestimated, Oak Ridge Effects Ignored

Recklessly ignoring possible effects on groundwater and seepage to East Fork Poplar Creek and Bear Creek, the Carbide/AEC "investigation" report failed utterly to consider the potential effects of the spill on the Oak Ridge and Anderson and Roane County people and environment. As the Observer reported January 12th:

> In the 1966 report, it never occured to Atomic Energy Commission and Union Carbide that the spill might ever extend beyond the Oak Ridge Reservation. While noting that there was a "Net Loss" of 49,853 of toxic methlmercury beneath a concrete slab, no environmental impact beyond the plant was discussed or considered in the four terse sentences on "Effects of Spill Loss" in the Carbide/AEC "Investigating Committee's report on the 1966 Y-12 50 ton mercury spill. "The mercury which is contained under the concrete slab does not present any forseeable hazard to personnel or future activities in Building 9201- 5. However, it may present problems when and if future building alterations are made which require disturbance of the subfloor in the area. The lost mercury will be affectively (sic) maintained in the confines of the building footings since the footings are

> located on hard shale. The only loss from within those confines would be through fissures, which may be present in the area sub-soil."... At a January 19, 1971 Tennessee Stream Pollution Control Board hearing on the Clinch River Basin, and aquatic biologist for the state of Tennessee said that East Fork Poplar Creek is "an aquatic desert...below the Y-12 plant all the way to the sewage treatment plant, there is apparently very little aquatic life."

This finding was ignored. The son of DOE's environmental director, perhaps reflecting Jerry Wing's thoughts, wrote "we have set out to prove him wrong" in a 1972 high school science project using AEC equipment.

Mercury Situation, Self-Regulation Representative

We have seen what self-regulation and unbridled, unaccountable government and government nuclear weaponry contractor did with mercury. Let us examine some other toxic substances and some other Oak Ridge nuclear facilities, in brief:

Other Pollution Problems

Elsewhere at Y-12, PCB's were no longer used as machinery coolants after October, 1972 due to health reasons. But unpermitted dredging of PCB-laden New Hope Pond, which feeds East Fork Poplar Creek, was still being done in Springs, 1973. In addition PCB's and solvents were merely poured into trenches into 1973. Oils and coolants were poured into trenches until 1978, and the State reported in March "some disposal still takes place."

As the Observer reported April 6, 1983 in the State's Notice of Non-Compliance:

> PCB's and solvents were merely poured into trenches until 1973, while other oils and coolants poured into trenches until 1978. "In 1968, it was noted that oil wastes were seeping out of the hillside below the trenches and entering the tributary, and thus the pond has a floating boom across the middle and submerged (inverted siphon) outlet with a constant discharge. During our visit, the oily wastes could

> be seen oozing out of the ground all along the valley below the trench area, and entering the tributary. The floor of the tributary valley was thick with oil. A sample taken of oil from the edge of the pond showed 906.5 ppm PCB."
>
> - While the "Burial Ground Oil Pond" is a "continuous point" polluter, "There is no permit for this discharge."
> - The "Burial Ground Oil Pond" built in 1968, dams a small Bear Creek tributary near the Anderson/Roane County line with the tributary "considered waters of the State. The pond is covered with a heavy oil layer consisting of high concentrations of PCB and probably other chemicals (such as solvents). The area uphill from the pond has been used for disposal of solid and liquid wastes for a number of years. Some disposal still takes place.

We should also note that at the Y-12 plant, uranium, PCB, and mercury contaminated sediments from the New Hope Pond have been dredged and placed on top of Chestnut Ridge -- without so much as getting a hazardous waste dumping permit. The Observer reported April 6, quoting state officials, that:

> Sediment from New Hope Pond was dredged and placed on top of Chestnut Ridge, with the latest "major dredging" in spring, 1973. No permit was ever obtained for the hazardous waste dump, with high levels of mercury, uranium and PCB's

Elsewhere at Y-12, an "isolation area" was used to dispose of solvents and chemical wastes until October 1981. Those wastes included cyanide, and chemicals from this misnamed "Isolation area" are seeping into the Burial Ground Oil Pond, which is in turn "a continuous polluter" of Oak Ridge streams and groundwater, State officials say.

> The "Isolation Area," was "used for disposal of solvents and other chemical wastes, including cyanide" until October, 1981. "Waste from this area likely seeps toward the oil pond. Disposal consisted of 'evaporated pits' and 'Stand Pipes' (shallow wells). Available groundwater data showed concentration of perchloroetylene of 23,195.5 parts per billion. Other elevated chemical concentrations were also noted."

> At two Y-12 "Disposal pits," located "in the watershed above the oil pond" wastes are disposed of in "open holes about 20 feet deep, 20 feet wide and lengths of perhaps 30 to 50 yards. Contaminated solid waste is dumped into the pits and allowed to stand in the [ground] water. Metal scraps (including uranium), barrels, electrical equipment, and other assorted waste could be seen in and near the pits...Enriched uranium waste, now is placed in both areas. Near the main [illegible] uranium chips are buried. Daily covering [illegible] is not practiced at these areas."..D[illegible] to allow state water pollution experts to [illegible] Y-12 pollution areas-saying DOE would have to take the pictures for the pollution probers at a later date to preserve "security."____/

Still another Y-12 pollution source is the "S-3 ponds," the early closure of which DOE has resisted in dealings with the state. The ponds are full of millions of gallons of acids, and has served as the headquarters of Bear Creek for a number of years. During the past several years, funds added in Congress for Y-12 waste water treatment were not spent or were reprogrammed, continuing this sort of waste disposal, as the Observer reported April 6th: quoting again from State Water Quality officials:

> About 1.5 million gallons a year of waste is put into "S-3 ponds" which are heavily acidic and are "known to leak badly into the headwaters of Bear Creek. The leakage can be seen coming through the southeast corner of the pond wall and a thick white deposit covers the bottom of the stream for some distance. Samples of Bear Creek were taken above and below the ponds as well as of the leakage. Available data indicates that waste put into the ponds consists of plating sludges, plating solutions, nitric acid, hydrochloric acid, stripping and cleaning solutions. HF acid, mop water (containing uranium, beryllium and thorium), halogenated solvents, non-halogenated solvents, as well as other waste. Most of the waste receives no treatment and is eventually either evaporated or leaded to Bear Creek. This disposal area has no discharge permit, however there is an NPDES permit location approximately five (5) miles downstream. This permit only contains discharge limits for oil and grease (concentration only) and pH. This disposal area has caused severe pollution of the upper portion of Bear Creek where existing data indicates the stream to be devoid of aquatic life."_____/

Radioactive Waste Mishandled

This exploration hasn't even touched on radioactive waste pollution yet. There are some 12 million cubic feet of radioactive waste in Oak Ridge, enough to fill in the 97,000 seat Neyland Stadium at the University of Tennessee. Prestigious Oak Ridge National Laboratory, like Y-12 also had its dirty little secrets: burial of millions of cubic feet of radioactive waste within the watershed and flood plain of White Creek and Oak Lake; which are Clinch River tributaries. DOE has admitted to the Observer there is even plutonium buried in the ground; no one is just sure how much might be there, although the conservative official estimate is at least 3 pounds.

DOE's own studies show radionuclides have leaked into Clinch River from its Reservation since at least 1949. Besides the plutonium, uranium, and thorium emitted by Y-12, ORNL has also emitted trititum, cesium, cobalt, strontium 90, zirconium, cerium, iodine and niobium._____/

Some of this waste has evidently migrated far downstream. As Louis G. Williams biologist and emeritus ecology professor from the University of Alabama at Tuscaloosa found after Hurricane David soaked ORNL burial grounds in 1978, a "slug" of radioactive material was pushed out. Professor Williams wrote that "I found concentrations of cobalt that were 6000 times higher than background and concentrations of strontium and cesium 8000 to 10,000 times higher."____/

Dr. Alvin Weinberg, Director of the Lab in its early days, admits the methods used then were "primitive." Reports from Union Carbide and the State of Tennessee show that at both the ORNL radioactive waste dumps and at the Y-12 plant, groundwater was so close to the surface in these moist areas, that the groundwater would and does often stand in freshly dug nuclear waste burial areas. [A photograph of one such Y- 12 water-filled waste disposal ditch containing uranium-contaminated scrap has been provided by DOE, which has refused to let the State of Tennessee take its own Y-12 pollution photographs for, you guessed it, "national security reasons."]

Bad Record-keeping, Radwaste Records Destroyed In Fire

Bad record-keeping and radioactive waste dumping information supposedly lost in a fire compound the ORNL pollution problem, as the *Appalachian Observer* reported October 20, 1982:

> As ORNL radioactive waste manager John Sease told the Observer, in the early days of Oak Ridge "basically people considered" radioactive wastes "as waste, not as a product. Not much attention was paid to records." Indeed, as Alvin Weinberg wrote in the September 1982 Conference Board publication, "Across the Board," one of his "great personal regrets of the 18 years I served as director of the Oak Ridge National Laboratory was that we did not elevate research on waste disposal to the key position that, in retrospect, it really deserved." During the 1940's, 1950's and 1960's, shallow land, burial of radionuclides showed sloppiness and allowed measurable quantities of radionuclides to escape into ground water, White Oak Creek, the Clinch River and the Tennessee River. Unfortunately, there was poor record-keeping in the early days, and DOE documents obtained through a Freedom of Information Act request reveal that a 1961 ORNL fire destroyed important documents revealing the types, concentrations and quantities of radionuclides buried at ORNL; Due to the fire, what was buried--and the exact boundaries of where it was buried--are not known with particularity. Low-level wastes with relatively short half-lives were among the buried wastes for which data is lost forever-but so were high-level transuranic wastes, including plutonium, the most deadly substance known to man, with a half-life of 24,000 years. John D. Sease, ORNL Radioactive Waste Operations Manager, told the *Observer* that "we know in general terms what's there, but we don't know what's there specifically." The loss of all the 1943-1958 ORNL waste dumping records is "regrettable," Sease said--"we would like to have the numbers."

Radwaste Buried In Watershed

If a reasonable and prudent man planned where to bury radioactive waste, where would he put it? In a wet, moist area which is part of the watershed of a creek which feeds Clinch River, in turn the Tennessee and Mississippi Rivers?

That's what AEC and Union Carbide did.

DOE officials now admit that was a mistake, as the Observer reported October 20, 1982:

> As two U.S. Geological Survey Scientists found in 1976, ORNL and the Idaho Nuclear Engineering Laboratory were both "poorly located," ORNL is in an "area crossed by surface runoff during wet periods," while INEL is "in a topographic low subject to seasonal flooding." At the old burial ground 4 at ORNL, closed in 1959, much of the buried waste in the ground has "come in contact with the groundwater and in some sections of the site waste is continuously submerged below the water table. Measurements of radioactivity have revealed activity above background at eight of the sixteen wells drilled for burial ground monitoring. Intermediate level liquid nuclear waste was simply dumped into "seepage pits" in the ground. Waste dumped at ORNL in this manner in the early years included "cesium 137, ruthenium 106, strontium 89 and 90, cobalt 60, antimony 125 and several radioactive isotopes of the rare earths.
>
> - Between 1952 and 1956 alone, approximately 5.6 million gallons of this waste containing 58,000 curies of cesium 137, 15,000 curies of ruthenium 106, and lesser amounts of other radionuclides was disposed of in these pits." A curie is the basic unit of radioactivity, equal to 37 billion atomic disintegrations per second--equal to the radioactivity in one gram of fresh radium.
> - Despite assurances that the wastes posed no danger to human health, radionuclides have been leeked out by rainwater travelling down through the burial grounds and into the water table. Cesium wastes have migrated as deep as 120 feet below the burial site.
> - "Contamination" was discovered in the 1950's, including radionuclides found in "nearby wells, intermittent springs and seeps."
>
> Until recent years, burial grounds have been open, with the possibility of radioactive particles from contaminated clothing, etc. becoming airborne.
>
> One report on ORNL solid waste disposal found that "for 33 years," radioactive solid wastes "were routinely

disposed of in shallow trenches in the absence of an effective burial ground monitoring program."

- A "bathtub effect" was created at ORNL waste dumps when excess amounts of clean fill dirt--added after burial ground 4 was completely filled in 1959--increased "the surface elevation and also increased the infiltration rate, thus raising the groundwater table to be less than 9 feet below the original land surface because of the change in topography and permeability. The resulting saturated conditions increased the transport of strontium 90 from the buried wastes." Only from one to two curies of radioactivity annually have flowed from burial ground 4 into White Oak Creek and the Clinch River in recent years resulting in continued posting of warning signs banning White Oak Creek fishing and swimming. Burial ground 5 also contributes some 8/10 of a curie to White Oak Creek annually.
- In 1974, ORNL researcher James O. Duguid reported that due to the "bathtub effect," in some burial ground locations "trenches behaved like tilted bathtubs...The trench fills with groundwater, which then seeps over the lower end of the trench and appears in surface seeps." Many waste dump trenches fill with water shortly after being dug, including one in burial ground 6 personally witnessed by an Observer reporter on a Carbide-supervised waste burial ground tour Thursday, October 14, 1982.
- In 1976 a National Research Council/National Academy of Sciences panel found that at one of the Oak Ridge burial sites, "water is moving through the solid waste and carrying contaminants away from the disposal site." Also, the New Yorker reported last year that "leaching of radioactive metals from low-level waste trenches at Oak Ridge (and elsewhere) has been speeded by the disposal of organic chelates--metal-bonding compounds that are frequently used in the decontamination of nuclear reactor piping and equipment. Material from this procedure is believed to combine with radioactive substances in the burial waste and to release into groundwater isotopes that would otherwise have combined with rock or been absorbed in soil."

During the height of the radioactive leaching from ORNL burial dumps, thousands of curies of low-level radioactive wastes found their way into the Clinch River. During 1956, ORNL records show 170 curies of cesium, 29 of ruthenium, 100 of strontium 90, 140 of Total Rare Earths minus cerium, 59 of cerium 144, 12 of zirconium, 46 of cobalt and .28 of Transuranic wastes wound up in the Clinch River.

> The highest level of transuranic wastes (TRU) ever entering the Clinch was 1.03 curies in 1967. The highest level of ruthenium ever entering the Clinch was 2000 curies in 1961. No measurements were taken for tritium until 1963; highest tritium amount detected entering the Clinch was 15,000 curies in 1973. Still, no danger to the public health was ever detected, with more research needed on the long-term effects of low-level radiation. Of course, former ORNL director Alvin Weinberg insists in his recent business magazine article that never did as much as 10% of the Maximum Permissible Concentration (MPC) of low-level radioactive wastes from the ORNL dumps ever contaminate the Clinch River. Pressed on the point, ORNL environmental coordinator Tom Oakes admits that those MPC levels have been reduced by 90% since the 1950's, and concedes that using today's standards there would once have been radionuclides at or above today's MPC levels. Oakes says, however that "I don't think it is fair comparing past releases to today's limits."_____/

Plutonium In Watershed

Unwatched and unaccountable scientists and engineers working for AEC and Union Carbide unceremoniously dumped even higher-level "transuranic" wastes like plutonium (with atomic numbers higher than uranium) into the watershed area radioactive waste dumps.

As the *Appalachian Observer* reported October 20th, 1982 after investigation and a tour of the dumps:

> - Oak Ridge's post-1970 high level plutonium and transuranic waste... is tored safely in casks, cylinders and drums above ground in flood- and earthquake-resistant concrete bunkers.
> - But prior to 1970, plutonium and other high-level transuranic wastes were buried -- along with low and intermediate level wastes -- in the same shallow trenches hacked into the Tennessee earth. While there was found to be no health hazard, measurable quantities of low-level radioactive radionuclides [have leached out of] these dumps... due to low water table and a man-created "bathtub effect" after too much fill dirt was put on top of the ORNL's burial ground 4.... Thomas H. Row, ORNL Nuclear Waste Programs Director, said that it would probably be best to leave the plutonium and other transuranic elements in the ground rather than dig [them] up. Digging it up would cause "more localized worker exposure" than thepotential health effects of leaving it in the ground. But Row says the Laboratory intends

> to do a cost-benefit study soon on what to do about the buried, high-level waste mixed in with the low-level waste at ORNL.____/

ORNL/Union Carbide calculations estimate that at least 3 pounds of ground-buried plutonium exists in the White Oak Creek area. The estimate has only a 50% confidence margin, as the Appalachian Observer reported February 16, 1983:

> There is at least 1.7 kilograms -- 3 pounds -- of plutonium buried in shallow underground trenches in the White Oak Creek watershed nuclear waste burial grounds at the U.S. Department of Energy Reservation in the City of Oak Ridge.
>
> Information obtained by the Observer from Oak Ridge National Laboratory confirms the existence of the buried plutonium -- the amount of which is at best a rough ORNL estimate.... [Officials at] Oak Ridge National Laboratory told the Observer Monday that it is believed "much" of the buried ORNL plutonium is contained in or on "contaminated equipment" including "old glove boxes" at the ORNL burial grounds.
>
> During burial, ORNL's Sease says, "there wouldn't have been any particular barrier" with only a biologically "degradable" box of wood or metal between the plutonium and the East Tennessee earth.
>
> Sease estimates that plutonium is not particularly soluble, and only at certain PH's in soil. "We've not seen any leakage of plutonium from the burial grounds," and have "not picked it up in close-in monitoring" of the ORNL waste dumps.
>
> The 1961 warehouse fire destroyed most radioactive waste dumping records for the 1940's and 1950's [making it] extremely difficult to know exactly where the buried plutonium might be in the 91 ORNL acres.
>
> ORNL's radioactive waste manager John Sease says that a "buried transuranic (TRU) waste proposal" his office made has not yet been funded. The Department of Energy's Transuranic Systems Office in Denver evidently places a higher priority on recovery of recoverable plutonium buried above ground since 1970.
>
> Possible options for dealing with the plutonium buried in Oak Ridge include:
>
> - building of vertical or horizontal "intrusion barriers" to keep the waste from getting out, which has been done on some sites where plutonium was buried in more recent years.
> - leaving it where it is and assuring that "institutional controls" keep it from being disturbed."
> - digging it up, in what Sease called "a mining operation" in which "a specially built mobile facility" would

> be constructed to permit digging, sorting and disposal of long-buried wastes without letting breathable plutonium particles into the environment.
>
> Department of Energy spokesman Wayne Range and Oak Ridge Operations environmental chief Jerry Wing say that there is no cause for alarm over the buried plutonium, and no need to search some 91 acres of nuclear waste burial grounds to dig up the plutonium.
>
> However, Oak Ridge National Laboratory nuclear waste programs director Tom Row says that a "cost-benfit study" will be done, eventually, to study whether removal or better containment of the buried plutonium is in the public interest.
>
> DOE's Wing asserts that studies of radioactivity in the Clinch River, White Oak Creek and White Oak Lake have concluded that there is no hazard to human health. However, those studies merely looked at levels of radionuclides in fish and river bottom sediments.They did not contemplate the possible release through leaching of buried plutonium, the most deadly substance known to man.
>
> According to figures provided by OakRidge National Laboratory's nuclear waste programs director Tom Row, there was a total of some 220,000 cubic feet of transuranic waste, including plutonium, buried in Oak Ridge National Laboratory nuclear waste dumps from 1943 to 1971.
>
> This includes the ORNL estimate of 1.7 kilograms of plutonium and an additional 3.5 kilograms of Uranium 233, buried among some 379,000 curies of radiation under 91 acres....
>
> A footnote to the ORNL information provided the Observer indicates that the number of cubic feet of radioactive waste listed is "Recognized to be accurate to" plus or minus 50%.
>
> Plutonium has a long "half-life" of 24,131 years--which means it will take that long for the radioactivity emitted by the buried plutonium to be reduced by 50%. Some plutonium-contaminated soil at the Rocky Flats nuclear weaponry plant in Golden, Colorado is being cleaned up (in the wake of fires and leaks which put it there). ____/

Dumping Irresponsible, Plutonium Scientist Said

A nuclear scientist who worked at the Oak Ridge National Laboratory for yhears found the February, 1983 revelations about burying plutonium in the ground to be more than mildly disturbing:

> A scientist with experience with plutonium told the Observer privately that if the plutonium bured in old ORNL waste dumps is not buried, it reflects "a lack of responsibility -- partly out of ignorance" -- on the part of those in charge of nuclear waste disposal in the early days of Oak Ridge Installations.
>
> If the government and Union Carbide are not sure where the buried plutoniumis located, there should be an effort to locate the plutonium and then "there should be some effort to make sure it doesn't get to the surface."
>
> The scientist also questions the 50% confidence level with which ORNL estimated that there were 1.7 kilograms (3 pounds) of ORNL buried plutonium, indicating that the Lab is not really sure. "That's a factor of 2.... quite a bit of difference" potentially in the amount of buried plutonium.
>
> The scientist also said of DOE environmental chief Jerry Wing's lack of concern that "Wing is in no position to know anything about it." The Observer is respecting the scientist's request for confidentiality. ____/

Radionuclides Into Air

Department of Energy nuclear facilities in Oak Ridge have the second highest level of radionuclide in the country -- second only to the small but serious emissions from the Feed Materials Production Center in Fernald,Ohio. ___/

Oak Ridge is far more populated than the area around the Ohio plant, but DOE is currently resisting the $lo million EPA wants it to spend to reduce uranium 234 and uranium 238 emissions from the Y-12 nuclear weaponry plant.___/

Gaseous Diffusion Plant Problems

There are also serious concerns about the safety of Oak Ridge Gaseous Diffusion Plant workers, including lung ailments alleged resulting from exposures to uranium hexafluoride and other uranium enrichment process gasses.

The U.S. General Accounting Office has found that the safety and health of gaseous diffusion enrichment plant workers is not assured by present practices of relying on the operating contractors to resolve safety problems. GAO found that:

> Employees with complaints are encouraged to seek resolution with the operating contractor. If the complaint is not resolved at this level, an employee may file a complaitn with the Operations Office. In many cases, DOE has delegated complete responsibility for handling complaints received by DOE to the contractors. Referral to the contrctor only sends the employee back to a situation from which he previouslv did not obtain resolution. If DOE's program is to ensure employee safety and health protection, it is imperative that the complaint not be recycled to the contractor.____/

Meanwhile, the Department of Energy response to the GAO GDP safety and health audit admitted:

> The Department of Energy, in its safety role, does not operate strictly in a regulatory atmosphere. The system operates on the concept that the Department identifies the objectives and the contractor develops the various means of meeting the objectives.____/

In an environmentally related problem, K-25 has long mindlessly wasted the thermal equivalent of four Clinch River Breeder Reactors by thoughtlessly and negligently failing to recover..or use hot water for industrial and district heating use in a proposed waste heat recovery park. This creates thermal pollution. Representative Lloyd, Senator Sasser, the Oak Ridge Chamber of Commerce and the State Energy Authorority, then headed by the late Oak Ridger Ed Spitzer all sought to get agreement by DOE, in 1977, so long ago, for recovery and use of the energy. perhaps in connection with the energy theme of the 1982 World's Fair. DOE never got around to it, after negative advice from a report by Exxon Nuclear discouraged prospects for the waste heat recovery park. [Some would think asking for Exxon's advice on energy conservation is like asking a prostitute for advice on chastity, but that's the way our DOE operates.

Histoplasmosis From Accumulated Bird Dung

In sworn pleadings which resulted in a $37,000 out-of-court settlement in Anderson County Circuit Court, a former Union Carbide employee, Jack Conn, alleged that accumulations of pigeon and other bird dung and excretions were allowed to build over years to dangerous levels in the old K-25 steamplant and in Y-12 Building 9201-4 that as a result of being sent into the buildings to survey them for possible re-use, he contracted histoplasmosis, the bird fungus disease. Mr. Conn alleged in his Circuit Court complaint that he has calcified lesions on his lungs and blindness in one eye all due to Union Carbide's alleged "negligence in failing to properly clean the area in which the infestation was known to exist prior to requiring the Plaintiff to perform his duties in said areas." ___/ Upon information and belief, there are also several other Union Carbide workers who allegedly have contracted histoplasmosis. ____/

One hates to say something potentially inflammatory, but there's a time and a place for it: it is painfully obvious from the record that the Department of Energy, its predecessors and Union Carbide Nuclear Division failed to cope with radioactive and toxic chemical wastes and keep them from leaching out into creeks, groundwater and the air. In fact, it would appear from the histoplasmosis lawsuit allegations that DOE and Union Carbide can't even seem to clean up pigeon dung correctly to protect the health of their own workers.

Same Land, Differing Views

Before turning to conclusions and recommendations, let us contemplate the different was which the Department of Energy and an outside critic group view the same land -- taken from Anderson and Roane County residents in 1942 with short notice, little compensation, no relocation assistance and not even advance notice to Governor Prentice Cooper.___/

One Middle Tennessee critic group, the Natural Rights Center, recently issued a report called "The Legacy of Oak Ridge: An Unclassified Briefing--Waste Migrates While Inspectors Quibble." That report opens dramatically:

> There is a place within the territory of the United States of America where the feathers of sparrowsset geiger counters clicking at 26,000 counts per minute, where each gram of soil over several acres contains over 50 picocuries of plutonium, and where over the last 40 years the creek and lake waters have exceeded state and federal regulations for allowable radioactive pollution. This place is not on the grassy plans around Rocky Flats, around the tumbleweed desert of the Nevada Test Site, or on the South Pacific island of Bikini, but in the rolling hills and foests of Tennessee. This contamination of nature and ins inhabitants is found near Oak Ridge, birthplace of the atomic bomb and for four decades a nuclear power laboratory and weapons factory.... the potential human tragedy grows deeper, and more inexorable, with each passing day.____/

In contrast, the Department of Energy refers to a large portion of this same land as its "Environmental Research Park." This bit of government euphemism would have done George Orwell proud.

CONCLUSIONS

1. The Government and its hand-picked contractor have committed serious, toxic and illegal water, air and land pollution amounting to major wrongful acts.

During most of the Appalachian Observer's 9-month investigation, the Department of Energy's response has largely been:

> - to show possible criminal intent in ignoring state and ORNL environmental pollution reports over the years
> - to say there's basically "no problem."
> - to put its head in the sand
> - to condemn people asking questions about its environmental devastation as "off-the-wall radicals"
> - and to basically brandish the Bad Old AEC attitude: "we are not responsible." ____/

2. Government and contractor self-regulation have been a perverse model of failure. Repeated acts ofpolluting the environment (including the workplace environment, the DOE Reservation and the City of Oak RIdge and its environs) have shown that DOE and Union Carbide are not fully competent to cope with environmental problems. They should no longer be trusted with making vital decisions on an unregulated or "trust me" regulation basis. where matters of public health protection and the environment are concerned.

Ironically, prt of the problem may be the institutional hubris-- the overweaning pride that goeth before a fall-- involved in the original Manhattan Project. Scientists here have long thought they could do anything, solve anything, and somewhere along the line became convinced they could do no wrong.

As former ORNL whistleblower Steve Gough told The New York Times, Oak Ridge is "an intellectual ghetto, an aberration, in which there is enormous peer pressure to conform.... THere is a definite feeling there that whatever is done is sanctioned --- it's okday, it's good science." ____/

University of Tennesseee hsitorians Johnson and Jackson write that Oak Ridge began with

> thousands of almost entirely young strangers [who] had been thrown together into a kind of instant community, all working on the same highly secret , massive project, [who all] tended to establish a sense of unity and commmunity of "us against them. ___/

Today, the historians write,

> beyond question, the dominant tone of the city remains set by the social and sometimes the political leadership from "the Lab" -- X-10, K-25 and Y-12. Working daily with forces considered mysterious and arcane by most outsiders, the scientists sense answers , both immediate and potential, to problems of radioactive waste disposal , possible theft of nuclear materials, radioactive contamination , and other fears voiced by opponents of nuclear energy. In a city that boasted at one time at least of more PhD's per capita than [any] other city in the country, the "high technology" -- the highly trained scientific personnel -- look to their skills for solutions and trust themselves and their friends to find them." ...The possibilities, as well as the dangers, inherent in the much maligned "military-industrial-scientific-labor-academic complex" are, and have been, graphically demonstrated in Oak Ridge.____/

One is reminded of President Eisenhoser's unheeded warnings about that complex.___/

At the top of the Department of Energy sits Energy Secretary Donald Paul Hodel, who told the Appalachian Observer about just how little he knew about the General Accounting Office's criticisms of the DOE contractors performing their own environmental monitoring. This is what the Reagan appointee said at a January 12 press conference:

> "I'm not familiar with the GAO report you're talking about, but I uh have had some experience with other GAO reports. Let me just say that with regard to the matter of monitoring, it appears to me that the question of monitoring is one that can be carried out by a contractor, by an independent contractor, or by DOE in accordance with the appropriate specifications. We do all kinds of things in this world where the individual involved is responsible and we audit the performance. It's a perfectly appropriate technique and to suggest that the only competent body is the Department of Energy I think is to try to prove to much--if that's what the thrust of the report is. But I haven't seen it, so I should probably withhold comment on it, on their specirfics.... I'm just not, I'm not familiar with that [serious monitoring errors found by GAO] and I would find that basically, um,

> I guess I find it hard to believe in light of what I know is the Department of Energy's concern (sic) for such matters and I would expect that the management here, as elsewhere, would insist that the people doing the monitoring do a first-class job of it. GAO has its own axe to grind and its own purposes and it's probably not appropriate for me to analyze what promoted those comments.____/

3. The Government and Union Carbide haven not yet apologized for what they have done to the environment and people of Oak Ridge and in Anderson and Roane Counties. Every possible excuse has been put forth:

a) National Security made us do it.
b) Those bad Soviets made us do it.
c) We were in a hurry to produce badly needed thermonuclear weapons of mass destruction and death.
d) Somebody "forgot" to turn a valve, so we lost 50 tons of mercury in one 1966 spill after the need for the lithium production had ended.

e) We lost the documents on radioactive wastes, including plutonium, which were dumped in a watershed area of a Clinch River tributary. They all burned up.

Some cynics say they're waiting for DOE officials to try to explain missing documents by saying "my dog ate my homework." Others suggest a new DOE motto for the Oak Ridge Federal Building- carved in marble:

( ) We forgot.
( ) We lost it.
( ) We were in a hurry.

CHECK ONE.

Quite frankly, the range of explanations suggests some DOE or Union Carbide public relations genius sat down with a basic Criminal Law textbook some afternoon, read a chapter on "justification and excuse" and went hog-wild thinking up examples of ignorance, mistake, necessity, public duty or duress to keep their colleagues out of jail.

This sort of excuse-making "bunker" mentality led the writer to rhetorically ask of DOE at Oak Ridge City Council:

- "Does being DOE mean never having to say you're sorry?"
- If the Soviet Union dropped 2.4 million pounds of mercury all over Oak Ridge, would that not be considered an Act of War?

What DOE did here would not surprise Polybius, who wrote centuries ago that "At Carthage, nothing which results in profits is regarded as disgraceful." ___/ Nor would it surprise the Roman historian Tacitus, who said of the sack of Carthage that "they made a desert and they called it peace." ___/

4. There is a crisis of confidence in an around Oak Ridge as a result of the coverup by Big Government and Big Business.

DOE and its predecessors, ERDA (Energy Research and Development Administration)and AEC (Atomic Energy Commission) and contractor Union Carbide Nuclear Division were long respected pillars of this community, where faith in government and corporate contractor integrity were long taken for granted. Because of a fundamental breach of faith, that blind faith by the people in and around Oak Ridge has perhaps permanently been lost over the government's possible criminal concealment of 2.4 million pounds of mercury losses into air, water and land from 1950 -1983. Oak Ridger newspaper editor Dick Smyser recently editorialized that:

> The extent of the mercury losses was great enough for both Carbide and the DOE to have taken the initative to call special attention to those losses a long, long time ago, like at very least in 1977 when a very comprehensive report on it was completed. But not only did officials not call any attention to the report, they consciously suppressed it.

> To the extent that they suppressed it for reasons of security we are tolerant, even with our predisposition to believe that security is abused- -- unnecessarily used -- as a reason for saying nothing, hiding.
> To the extent, however that the information was supppressed because it was felt that it would be misunderstood, distorted --over-reacted to by an ignorant public --even an ignorant press -- then the decision to suppress was not just reprehensible, it was stupid.
> And that, we would hope, might be the most important lesson of all learned by the officials concerned. For the mentality that assumes that given information fully and fairly the public will be incapable of handling that information is a very dangerous mentality. And yet it is a mentality that is found all too often at high official levels, not just in government but in business and industry too.
> The public not only has a right to know. The public is many times more capable of knowing than so many give it credit for being.
>
> Which is why, of course, when the public finds out that it has been deliberately denied information by some presumptive "protector", it doesn't like it one bit and looks with justifiably skeptical eye at not just the specific information in question but at the whole total integrity, intelligence --of those who have presumed to keep it uninformed in the past. [Emphasis added]

5. There is probable cause to believe that criminal acts have occurred, including misdemeanor violations of the Tennessee Water Quality Act of 1971 and criminal violations of federal water pollution and toxic waste dumping laws. ____/

Corners were cut in producing nuclear weapons and nuclear power research -- in ways which put human lives and the environment at risk.

A good case can be made that Union Carbide and the US. Atomic Energy Commission (and its successors) displayed, in criminological terms, a "criminaloid personality." As described by scholar Edward Ross in 1907, the essence of the criminaloid is "moral insensibility:"

> Nature has not foredoomed them to evil by a double dose of lust, cruelty, greed or jealousy. They are not degenerates tormented by monstrous cravings. They want nothing more than what we all want-- money, power, consideration -- in a word, success; but they are in a hurry and they are not at all particular as to the means. ____/

6. We can infer criminal intent from, among other acts:

- repeated false statements of no environmental problems
- possible falsification of data by filtering water samples before testing for mercury
- suppression of the 1977 ERDA report on 2.4 million pounds of mercury losses
- failure to warn afffected population groups
- failure to take reasonable care with lethal mercury after the mercury/lithium process was abandoned, including massive 50 ton spill in 1966 (supra, pp. 22-26) and failure to drain all equipment until 1977
- failure to properly consider that mercury under Y-12 buildings would stay there, completely ignoring the possibility of underground migration in the only contemporary "investigation" of any mercury losses
- misrepresentations to Tennessee Valley Authority officials
- failure to obtain toxic waste dump and National Pollution Discharge Elimination System (NPDES) permits for all pollutants
- failure to seek all possible information on the interactive effect of DOE's pollutants on human health, including whatcould happen when you mix human beings and mercury, PCB's uranium, thorium, plutonium, acids and heavy metals in the same stream.

Probable violations of criminal law have been committed

Will they be investigated? Will indictments be handed up? Will people be prosecuted and imprisoned for their anti-social behavior?

Or will the combined might of National Security rhetoric, bomb-builder influence and the implications of crimes involving the U.S. Government and multinational corporation Union Carbide (number 27 on the Fortune 500 ___/ , with annual sales over $10 billion) result in the absence of justice?

Will this case be "fixed?"

That depends on what happens next.

RECOMMENDATIONS

1. CLEANUP Priority number one, already proceeding under State, TVA and EPA supervision, must bwe full, complete and immediate cleanup of the serious environmental pollution problems created by DOE, no matter what the costs.

2. *STUDY AND INVESTIGATION*: To the resources of TVA, the State of Tennessee and EPA must be added the work of environmental, health , investigative and prosecutorial agencies, including:

- Center for Disease Control to do a thorough epidemiological investigation of Oak Ridge, Anderson and Roane Counties and Oak Ridge plant workers.
- Nuclear Regulatory Commission
- National Institute of Environmental Health
- National Institute of Occupational Safety and Health
- Occupational Safety and Health Administrtion
- Bureau of Radiological Health
- Federal Bureau of Investigation
- U.S. Department ofJustice, including U.S. Attorney and the Land and Natural Resources and Criminal Divisions

To assure objectivity, DOE and Union Carbide personnel, particularly those responsible for key pollution and coverup decisions, should be involved in this phase as little as possible, except as persons to interview for information.

3. *DISCLOSURE*: Working hand-in-hand with the investigation, there must be timely, complete and accurate public disclosure of information about Oak Ridge environmental pollution. This writer was pleased to see the DOE adopt his May 23, 1983 suggestion by placing relevant materials at the Oak Ridge Public Library. Still more material must be dug up and made available to the press, the public and to prosecutors. *The Appalachian Observer*, on January 18, 1983, made an "omnibus request" for all record indexes on environmental pollution questions, in order that we might find more important information for our readers. *DOE refused to comply with this simple request.*

Ideally, all DOE and Union Carbide information on environmental and health problems would be declassified and placed on open-shelf access for the public and press -- just like the U.S. Securities and Exchange Committee does with corporate filings in Washington, D.C

Certainly health is as important a government concern as wealth, and the expense of open-shelf acess to everything would be well worth it in assuring an informed public.

4. CRIMINAL PROSECUTION: Criminal convictions were recently obtained in the State of Maine by federal prosecutors who went after a persistently water-polluting tannery and those responsible. There is no reason why the same rule of law should not apply in the State of Tennessee for pollution which clearly involves the willful, wanton, negligent pollution of streams and groundwater with mercury, uranium, PCB's, cadmium, lead, methylene chloride, hydrochloric acid, hydrofluoric acid, nitric acid, perchlorothylene, cyanide, byrillium, halogenated and non-halogenated solvents, oil; tripping, cleaning and plating solutions; acidic coal-pile runoff, plutonium, tritium, cesium, cobalt, strontium 90, zironium, cerium, iodine, niobium, and sewage effluent.

The late U.S. Attorney General Robert F. Kennedy once termed organized criminals, including corporate ones, "The Enemy Within." _/ Here in Oak Ridge, government and contractor scientists and technocrats were so busy using their skills to fight the Enemy Over THere that they forgot about people living behind the fence. They showed what Ronald Reagan has termed a major defect of federal government, which like a baby, is said to be "all appetite on one end and no responsibility on th other."?/

Robert Kennedy once said that "if we do not on a national scale, attack organized criminals with weapons and techniques as effective as their own, they will destroy us."

For their crimes involving violence, concealment and wanton,reckless disregard for the value of human life, officials responsible should in this writer's personal opinion be required to spend some time in the Anderson County, Oak Ridge or other Jail, or else some federal country club prison for white collar inmates.

Tennessee has 48 hour minimum sentences for those convicted of either reckless driving or driving under the influence of an intoxicant. It would be an absurdity and a mockery if those responsible for all these years of pollution got off Scot-free.

Only in prosecution will there be deterrence.

According to the 1967 report of the Public Land Law Review Commission, fully 53.5 million acres are controlled by either the Atomic Energy Commission (now DOE) or the Defense Department.___/

If willfull, heedless pollution of that part of the national defense lands is tolerated, where will be the deterrence for others to keep them from turning the rest of the massive acreage into a National Sacrifice Area.

5. LEGISLATIVE CHANGES: Never again should a government nuclear installation and the government contractor's officials be allowed to romp about in secretive sweetheart dealings, creating massive pollution while seeking to conceal it from everyone through deceit. As the Appalachian Observer editorialized October 20, 1982:

> A good start would be to work to remove responsibilities for nuclear radiation [and other environmental] monitoring from the exclusive, provincial and possibly biased control of Union Carbide Nuclear Corporation and Oak Ridge Associated Universities, both key elements of the nuclear-industrial complex.
>
> A man cannot serve two masters, the Bible tells us.
>
> Neither can we expect two organizations dedicated to proliferation of nuclear technology to be properly skeptical, investigative and thorough about [for example] environmental health risks of nuclear facilities and waster burial grounds.

> Congress should attach specific language to future energy authorization and appropriations bills [or the Atomic Energy Act] removing the obvious structural conflicts of interest inherent in assigning monitoring environmental impacts to the creators of the environmental impacts. /

All major environmental, safety and health regulation responsibiities should be permanently severed from DOE and its present contractors, and given to competent and courageous regulators in other agencies, or to a seperate environmental supervision contractor of integrity and accomplishment.

6. PUBLIC PROTEST Finally, as we editorialized April 6:

> Somehow in our cynicism, we are used to private, multinational, monopolistic chemical companies putting dollars [ahead] of people.
>
> This,however, is a case of toxic water pollution of our own U.S. Government, a development which would make our Founding Fathers like Jefferson and Madison sick at heart.
>
> As U.S. Representative Al Gore, Jr. has said, only "public protest" can bring about needed action on toxic chemical waste dumps.
>
> What is it going to take for the DOE to get the message? A hundred thousand people on the lawn of the Oak Ridge Federal Building protesting a potential government-caused "ripple of death?"
>
> You tell us, DOE.
>
> The ball is clearly in your court. ___/

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WORK EXPERIENCE

981-present: Editor, Appalachian Observer, Clinton, Tennessee weekly newspaper. Thorough coverage and investigations of questionable governmental and corporate activity, including Tennessee Valley Authority, Union Carbide Nuclear Corporation, U.S. Office of Pesonnel Management, Circuit, Criminal and Chancery Courts of the 28th Judicial Circuit, County Property Assessor, School Department, Sheriff's Department, District Attorney General's Office, Jury Commission, County Commission, Election Commission, major oil and energy corporations and large landholding companies, et. al.

Elected Chairman Pro Tem and Investigations Subcommittee Chairman of the Anderson County Commission's Special Tax Study Committee after a series of articles about major coal, land, oil, and gas corportions avoiding equitable property taxation of their large-scale mineral property and lease interests

Among areas of interest at the Observer: energy antitrust; questionable government purchasing practices; environmental health hazards including asbestos in schools and 8 million cubic feet of nuclear waste in and around the City of Oak Ridge; unrepresentative jury selection practices; failures of election statutory safeguards; unequal justice in local courts; de facto segregation in Courthouse employment and private clubs; excessive use of force and other Sheriff's and police abuses; waste, fraud and mismanagement, including embezzlement and misuse of public funds, including CETA job training monies.

1978-80: Freelance investigate reporter and consultant, including work for ABC News' 20/20; Crossroads Magazine (formerly Coal Patrol; Consumer Federation of America (on contract to Congressional Office of Technology Assessment). Work included government's slow reaction to the effect of higher energy prices on low-income consumers; TVA coal procurement fraud and mismanagement, including apparent U.S. Senatorial conflict-of-interest; serious questions about proposed coal slurry pipeline legislation; the technological alternatives to dangerous coal haul roads; and the broad range of anti-competitive monopoly practics in the U.S. and global energy industries.

1977: Legislative research assistant, Senator Jim Sasser. Covered Energy, Natural Resources, Banking, Housing and Urban Affairs; Finance, Budget and Veterans Affairs issues.

Developed legislative proposals, including portions of two public laws (Coal Industry Performance and Competition Study amendment to the Powerplant and Industrial Fuel Use Act and the Small Cities Needs Study amendment to the Housing and Community Development Act.

Developed other legislative proposals, including Taxpayer Assistance Fairness Act; Great Smoky Mountains Wilderness Act; and floor amendments promoting more competitive "wheeling" of electric energy between public and private utilities and more competitive development of cogeneration and waste heat utilization facilities to conserve energy.

1976: Staff Assistant, U.S. Senator Gary W. Hart. Part-time work included routine office and mailroom work; constituent casework; grants; and legislation.

1974-76: Intern, U.S. Senator Edward M. Kennedy. Part- and full-time work included routine mailroom, office and errand work; grants and constituent casework; and legislation, including pelagic whaling and efforts to develop Southwestern desert Indian cultivation of jojoba plants as cash crop and sperm whale oil substitute.

EDUCATION

- Georgetown University School of Foreign Service, Washington, D.C.
- Camden County College, Blackwood, N.J. (during high school and first college vacation)
- Clearview Regional High School, Mullica Hill, N.J.

PERSONAL DATA

Born March 20, 1957

Mr. Gore. Thank you for your statement, and thank you for summarizing portions of it.

Dr. Stephen Gough is our next witness. Dr. Gough, you have also been an active participant in these matters, and we look forward to hearing your testimony.

STATEMENT OF DR. STEPHEN B. GOUGH, FORMER EMPLOYEE OF OAK RIDGE NATIONAL LABORATORY, ENVIRONMENTAL SCIENCES DIVISION

Dr. Gough. Thank you.

My name is Stephen Gough. I am a former employee of Oak Ridge National Laboratory where I was a research biologist in the Environmental Sciences Division for 6 years, until June of last year.

I am happy to provide you information to assist you in your inquiry, and I will attempt to limit my remarks to a very brief summary of my written testimony. I trust, therefore, that you will inquire of any point made in that statement which is not highlighted here, but for which you desire additional information.

My remarks cover two major areas: Information on mercury contamination itself, and information relevant to the concept of suppression of data by Union Carbide employees. To cover both of these items coherently, I will provide a chronology of germane facts derived largely from my personal experience while at ORNL. I do not find finger-pointing pleasant; however, to hopefully prevent future occurrences of improprieties and due to my somewhat special relationship to certain aspects of the so-called mercury incident, my testimony necessarily deals with reactions of Union Carbide management.

During 1978 and 1979, I prepared analyses and wrote sections for the Environmental Impact Assessment for the K-25 site in conjunction with other ESD staff. As you know, this site is approximately 14 river miles below Y-12 where the East Fork headwaters are. Several sections of the final report which was published in 1979 discussed elevated mercury levels, and Y-12 was mentioned as a probable source of the vast majority of the mercury.

Recommendations for further action were included in this report and included additional monitoring and research to assess health and ecological effects. To my knowledge, no significant action to this end was undertaken until the May 1982 ORNL study which was done as a followup to sampling undertaken by me and an employee of the USGS in December 1981.

An early draft of my section on the K-25 assessment also contained the recommendation that portions of the creek be posted to warn against fishing or related activities due to mercury and other contaminants. At that time, by the way, the FDA action level was 0.5. This item regarding the recommendation for creek posting was edited out of the assessment by someone in a later draft.

As a result of this and some difficulties I experienced in obtaining data I required to perform my analysis, I became aware of the fact that the mercury contamination issue was sensitive from a public relations standpoint. I was assured then, and repeatedly thereafter, that it was not sensitive for reasons of national security.

On December 5, 1981, my brother, who is a biogeochemist with the U.S. Geological Survey, and I, discussed the possibility of initiating a joint research project between the USGS and ORNL that would take advantage of our collective expertise and that of our parent organizations. We concluded that the East Fork Poplar Creek and Bear Creek might be highly suitable for a study of trace metal dynamics in plants.

To provide preliminary data to justify proposal preparation, we decided to collect grab samples of mosses, liverworts and sycamore rootlets from the stream and have the tissues analyzed in the USGS Denver laboratory. When the data obtained were coupled with other available information, a case could easily be made that further study was warranted on scientific grounds. Furthermore, the results obtained were so unusual that the question of whether any health or ecological effects were possible was automatically an issue. It should be noted that the December sampling was never meant to be a stand-alone study; it only provided preliminary data.

Furthermore, our intent was not to engender a public relations panic. The reaction which occurred when our results became known to the Union Carbide management was not at all expected. Some of the consequences of that reaction included a squashing of further analysis and a request that all material be returned from the USGS without any official recording, the inability by me to pursue this or similar projects, a reprimand for the action, threats aimed at preventing public disclosure of any information, a rapidly deployed followup study by Union Carbide and my removal from consideration for promotion to the position of Y-12 environmental coordinator.

These and other related factors prompted me to resign my position and accept another in June 1982. Since September 1982, I have been cooperating with the Office of the Inspector General of DOE, which is conducting an investigation into possible improprieties. I have provided Mr. John Bogott, supervisory criminal investigator, with information, first as a confidential informant and later as an identified source. It is my distinct impression that he is carrying out an extensive and professional investigation, and I am extremely encouraged by his efforts. He and Mr. La Grone have restored my faith in the ability of the system to solve this problem.

My December 1981 findings must be interpreted carefully, and I will address a few comments on them as follows: One, the mercury values were large and unusual and replicate testing of the same material gave comparable values each time.

Two, other data available at the time suggested high mercury values were probable within the East Fork system, thus lending greater credence to the values that were obtained.

Three, bryophytes—that is, mosses and liverworts—are recognized indicators of heavy metal contaminations. The concentrations they display are often indicative of the degree of sediment contamination. Their value in predicting the degree of contamination of the East Fork is rather well upheld when comparisons are made with the data from the so-called official ORNL May 1982 study.

Four, taking into account all available plant tissue data, the upper reaches of the East Fork appear to have some of the highest plant mercury values in the United States. I do emphasize, however, that this may not have any health significance.

The remainder of my remarks are generic and are drawn from several sources. Unfortunately, distance and lack of opportunity have precluded the use of much of the available data.

One reason the fish tissue mercury average is not higher is probably due to the hydrodynamics of the stream and the current location of the highest mercury sediment burdens. In other words, the probable mercury levels which are highest probably occur closest to the headwaters, where the stream is shallow and large fish which tend to have the highest concentrations per unit weight are extremely uncommon. Thus, if the sediment mercury burden moves as a spike, higher fish tissue levels may result.

The ability to assess this and other major events depends, among other things, on an understanding of the geochemistry of the sediments, the spiraling, if any, of mercury within biota and the action of microorganisms. Understanding these factors requires much more monitoring and research than is available from the May 1982 ORNL study. Similarly, the recommendations made in that study are good, but they do not go far enough.

It is difficult for me to imagine that any large-scale remedial measures, such as those being done by TVA and Olin in Saltville, Va., are either feasible or necessary at this time. If the use of the flood plain and stream proper continues to be restricted, and additional research and monitoring are conducted, restorative measures may never be instituted. However, it would be interesting to consider the resources needed, the probable impact, and the probable benefit to be derived from a limited dredging of the upper reaches.

The logistics of providing future accountability for control of discharges have hopefully already been set in motion by the task force formations, the recent DOE-EPA agreements which have been promulgated, and this hearing. For the record, however, some of my thoughts on this are contained in attachment 8 to the written testimony.

From the data I have seen so far, the situation appears to warrant reasoned concern, but certainly not panic. Furthermore, the "bureaucratic sensitivity" appears to be turning around for the better. The actions and rhetoric of DOE, at least, indicate probable concern and honest desire to change.

Thank you.

[The prepared statement of Dr. Gough follows:]

TESTIMONY OF

DR. STEPHEN B. GOUGH

BEFORE THE

SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT

AND THE

SUBCOMMITTEE ON ENERGY RESEARCH AND PRODUCTION

HOUSE COMMITTEE ON SCIENCE AND TECHNOLOGY

ON:

THE IMPACT OF MERCURY RELEASES AT THE OAK RIDGE COMPLEX

OAK RIDGE, TENNESSEE

11 July 1983

This document includes: (1) information on mercury contamination of East Fork Poplar Creek, Oak Ridge, Tennessee; (2) possible monitoring efforts to assess ecological effects and health risk; (3) opinions on restoration and remedial measures; and (4) an account of the reaction of individuals within Union Carbide Nuclear Division (UCCND) to developments related to the mercury contamination. It is my understanding that extensive testimony will be presented by others on topics 1-3, including information based on more recent data than that available to me. Therefore, I will focus my remarks on item 4 and on those aspects of the other topics which may not otherwise be covered by other witnesses. Furthermore, I will limit discussion to the mercury issue, except for passing reference to other pollutants.

I was employed by Union Carbide Corporation from 1976 until June of last year. I voluntarily resigned for ethical reasons, and to avoid a probable reduction in force (RIF) action. During my tenure I was a researcher in the Environmental Sciences Division at Oak Ridge National Laboratory. My functions included environmental impact analysis for the Nuclear Regulatory Commission (NCR), the DOE and other government agencies; the procurement of new funding; the conduct and coordination of research in microbiology and toxicology; and the advisement of laboratory staff on water quality issues. I am now employed in Fredericksburg, Virginia, with System Development Corporation where I perform computer systems engineering, and provide supervisory/managerial support for military and biomedical projects. (See Biographical Sketch, Attachment 1).

Most of my remarks are provided in the form of a chronology spanning a five-year period. I feel this is a more coherent way to convey a relatively complex and multifaceted issue than to cover each point on a topical basis. Of necessity, my comments deal with historical information. While there is validity in the comment, made recently by Mr. La Grone, that it can be "debilitating to worry about the past when much needs to be done in the present," elements of the past must be recognized to prevent recurrences of mistakes and to determine appropriate action for the future. It is in this spirit that comments regarding improprieties are presented.

I wish to clarify a few major points which I sense may be misunderstood by some individuals; viz:

(1) Despite comments in the supervisor's report (Attachment 2), the sampling I conducted with my brother was only done to provide information to justify a proposal for research funding. There was no malice intended, and we both worked within the framework of the "system" as we perceived it. Even after I left the laboratory, information was funneled only to DOE (until after the majority of the facts were made public by others). It is true I felt there was a moral responsibility to pursue the issue to some logical conclusion, but no "a priori judgements" were made. I feel the sampling was totally within the realm of that expected of a productive and unbiased researcher who, by definition, should not be compelled to be concerned with whether he is perceived as an "environmental policeman" or whether an issue is "bureaucratically sensitive."

(2) The sampling and subsequent analysis was not done secretly or surreptitiously. My line management was informed of my activities and motives well in advance of the receipt of the data from the USGS.

(3) There were never any contentions that the sensitivity with regard to the sampling was in any way related to national security. This issue had been raised, appropriately, at an earlier date (during the K-25 environmental

assessment work) and resolved. While mercury inventories and similar data may have been classified (at the time), the fact that mercury was in the creek was not.

(4) It follows from the above that it is questionable if the sampling was really "unauthorized." This is especially problematic when it is realized that the official study done in reaction to our findings incorporates our data into its text without disclaiming them as unauthorized. Further, it was indicated to me that the reaction of the "system" to our actions would have been no different if the samples had been taken on private land within the city; i.e., the only item that resulted in a verdict of "unauthorized" was the fact that I was an employee.

While several points of a similar nature could be listed here, it is probably inappropriate to continue this discussion for this audience. Instead, such items will be (or have been) related to the Office of the Inspector General and/or DOE Operations for administrative review. Additional information relating to personnel actions is contained in the chronology (below) to provide some insight into the charges of information suppression.

As explained in the chronology, my brother and I collected samples of bryophytes and sycamore rootlets to provide a preliminary indication of trace metal values in plant tissues for the purpose of preparing a scientific proposal for detailed investigation. The results (Attachment 3) must be interpreted with extreme caution, especially if they are not coupled with other data. This is because the sampling was only done on one day, it only involved a few species and only select locations were sampled. For our purposes such "grab" sampling was adequate. Despite the preliminary nature of the findings, several statements can be made:

1. The mercury values were large and unusual, and replicate testing of the same material gave comparable values each time.

2. Other data available at the time of our analysis (e.g., the K-25 EA) suggested high mercury values were probable within the East Fork system, thus lending greater credence to the values.

3. Bryopytes are recognized indicators of heavy metal contamination. Like fish, the concentrations they display are often indicative of the degree of sediment contamination. Their value in predicting the degree of contamination of the East Fork is rather well upheld when comparisons are made with the data from the "official" ORNL May 1982 study (see ORNL/CF-82/257).

4. Taking into account all available plant tissue data (our samples and the samples from the study cited above), the upper reaches of the East Fork appear to have some of the highest plant mercury values in the United States. This may not have any health significance, however.

Since I only recently received the results of the May 1982 study, I presume Dr. Auerbach will discuss the report fully. Therefore, I will only refer to it briefly. The remarks which follow are generic and draw on several sources. Unfortunately, distance and lack of opportunity have probably precluded my use of much of the available data.

One reason the fish tissue mercury average is not higher is probably due to the hydrodynamics of the stream and the current location of the highest mercury sediment burdens. In other words, the highest sediment levels appear to occur closest to the headwaters, where the stream is shallow and large fish (which tend to have the highest concentrations per unit weight) are extremely uncommon. If the sediment mercury burden moves as a spike, higher fish tissue levels may result. The ability to assess this and other major events depends on an understanding of the geochemistry of the sediments, the spiraling (if any) of mercury within biota and the action of microorganisms. Understanding these factors requires much more monitoring and research than is available from the May 1982 ORNL study. Similarly, the recommendations made in that study are good but they do not go far enough.

It is difficult to imagine that any large-scale remedial measures, such as those being done by TVA and Olin in Saltville, Virginia, are either feasible or necessary at this time. If the use of the floodplain and stream proper continues to be restricted, and additional research/monitoring are conducted, restorative measures may never be instituted. However, it would be interesting to consider the resources needed, the probable impact, and the probable benefit to be derived from a limited dredging of the upper reaches (with cofferdams) coupled with a by-pass of New Hope Pond (to avoid any contribution from the pond sediments). Such an exercise may be purely academic, particularly when one realizes that the biggest unknown -- subterranean contamination -- may be a significant contributor. If dredging is considered, can the costs be partially offset by metal recovery?

The logistics of providing future accountability for control of discharges have probably already been set in motion by the task force formations and the extensive DOE-EPA (et al.) agreement(s) which have been promulgated. However, for the record, some of my thoughts on this are contained in a mailgram found in Attachment 8.

From the data I have seen so far, the situation appears to warrant reasoned concern, but certainly not panic. There are a few things I might do differently if I still lived in Oak Ridge, but not too many. Chief among them would be soil testing (if I had reason to suspect fill had been used), some change of fishing habits and restrictions on certain activities of children. The water supply would not concern me, nor would the air, unless I worked in one of the contaminated buildings.

The "bureaucratic sensitivity" appears to be turning around for the better. The actions and rhetoric of DOE, at least, indicate probable concern and an honest desire to change. Oak Ridge is moving in ways its citizens can take pride -- it should emerge a stronger, better city.

CHRONOLOGY:

This chronology contains a brief account of information on mercury contamination on the Oak Ridge Reservation which became known to me during my tenure at ORNL (1976-1982). To provide the subcommittees with some insight into alleged information suppression, the following also deals extensively with the manner in which mercury information was handled. Conjecture is purposefully avoided, where possible, to provide individuals the ability to form their own opinions. The material, of necessity, contains considerable information about my personnel history at ORNL.

During 1978 and 1979 I intermittently worked on the Environmental Assessment (EA) for K-25 (DOE/EA-0106, Environmental Assessment of the Oak Ridge Gaseous Diffusion Plant Site, December 1979). I wrote several sections which mention elevated mercury levels and which point to Y-12 as the probable source. Some of the sections also recommend additional action, such as more extensive monitoring and research, to assess whether any health or ecological effects are occurring. K-25 itself, which was scrutinized carefully for this assessment, appeared to do little environmental harm. The hydrological justrapositon of Y-12 and K-25 coupled with the other known contaminant sources made it evident that Y-12, the West End Sewage Treatment Plant and coal mine drainage are largely responsible for water quality degradation at the ORGDP site. Of these, Y-12's contribution seemed most significant in the area of mercury and PCB burdens. Other impacts, such as high organic loading, were not attributed to Y-12.

The EA's recommendations for further action on the mercury issue were similar to those given in J. Elwood's Central File (UCCND) Memo of 1977 (Elwood to Richmond, 6 June 1977, "Mercury Contamination in Poplar Creek and the Clinch River," ORNL/CF-11/320). Additionally, the idea of preventing or discouraging fishing by posting portions of the East Fork (and of Poplar Creek proper near K-25) were included in an early draft of my assessment but were "edited out" by others. This action, along with the difficulty I experienced in obtaining some of the extant data (e.g., I asked for Elwood's 1977 memo several times before receiving it), resulted in my first substantive awareness of the lethargy of the system in dealing with the mercury issue in a forthright manner. It was not clear to me then, as it is not clear now, exactly who considered the data "sensitive." In the Environmental Sciences Division (ESD) all the data except the K-25 assessment itself were considered "business confidential." It was presumed by most of us who worked with the mercury data that such a designation ultimately derived from higher management within UCCND or DOE.

My assessment was reviewed for technical accuracy by individuals within ESD who had extensive experience with heavy metal effects, particularly mercury. Among those consulted for formal or informal critiques were Dr. Jerry Elwood, Dr. James Loar (whose data I also used--see ORNL/TM-6714), Dr. J. Huckabee and Dr. S. Hildebrand. Additionally, the assessment received the customary managerial review to sanction it as an official ESD/ORNL submittal.

During my analysis of K-25 a draft document was discovered which mentioned mercury contamination. The "Three-Plant" Environmental Analysis (PDEA, Oak Ridge Operations, US ERDA, 1975-1976) was apparently begun in 1974 or 1975 to assess impacts from all DOE Oak Ridge facilities. Exactly who authored the draft is not known to me (except for a few of the individuals from ESD), and its ultimate fate is unknown. To the best of my knowledge it was never officially published. However, Volume X, Section 4.2.1.3, 1 August 1975, summarized the "unavoidable adverse environmental effects" of Y-12, stating "potential hazards to natural plant and animal communities....exist from the many heavy metals disposed of each year (i.e., mercury and cadmium)." It mentions other potential problems and another section (in Volume VII) is listed in a table of contents as containing a detailed description of environmental impacts. I do not recall seeing the latter discussion, and no mention is made of it in my notes.

The ORGDP assessment received DOE/HQ review. Many comments were received which indicated significant concern with regard to some of the contaminants in the East Fork. HQ also felt that certain issues were not addressed in enough detail (if an EIS was to be issued). For example, Ray Berube, Office of NEPA Affairs, wrote: "there is apparently significant contamination of surface waters with mercury and PCB, yet the sources have not been pinpointed." Based partly on the feeling that providing such detailed information was beyond the present scope, the document was "downgraded" to an environmental assessment (21 September 1979, letter to J. Boyle (ORNL) from J. Wing (DOE/ORO) re:ORGDP Environmental Impact Document).

Attachment 4 of this testimony contains excerpts from the ORGDP EA, including paragraphs specifically related to Y-12 mercury issue.

In 1980 I became involved in the planning for the environmental assessment slated to be done on the X-10 (ORNL) site (i.e., J. Boyle, et al. 1982, Environmental Analysis of the Operation of the Oak Ridge National Laboratory (X-10 Site), ORNL-5870). Although I attended a few scoping meetings and participated in some initial discussions on field sampling, I was ultimately reassigned to other projects. Attachment 5 includes a copy of a memo given to me by the author of the aquatic sections of the ORNL EA. It provides some preliminary perspective on the mercury issue at ORNL compared to Y-12.

Although my involvement in the Environmental Impacts Program of ESD decreased considerably during the ensuing years, I continued to maintain an interest in local impact problems. Thus, I helped ORNL Environmental Staff assess problems with nuisance plant growth on sewage ponds and participated in an effort aimed at monitoring and controlling Legionnaires' disease bacteria (LDB; Legionella) in the many cooling towers on the Oak Ridge Reservation. This latter effort was deemed sensitive from a public relations standpoint but was, by and large, handled openly.

During 1979 and 1980 I became an integral part of efforts to secure additional funding for research in the Aquatic Ecology Section. Successes in this regard included the procurement, with Dr. Richard Tyndall, of a 0.5 million dollar contract from the Electric Power Research Institute (EPRI) and of $300,000 from the Nuclear Regulatory Commission (NRC). Both projects were awarded to study environmental variables affecting Legionella in power plant environments. I became project coordinator (in addition to co-principal investigator) in the former effort.

It is with some hesitancy that I provide background information like the above, since it may not appear to provide data relevant to the hearing. However, since it has bearing on personnel matters (a later demotion, etc.) which were, I feel, a direct result of the mercury sampling, it is important in any consideration of information suppression. It is not my intent, however, to use my testimony as a "soapbox" since there are other, more appropriate forums for contesting an administrative action.

While the Legionella research projects provided important scientific information, the EPRI one was fraught with problems at the outset which were beyond my control. In particular, funding from it was continually redirected to other projects since I had very little actual spending authority. This was easy for management to do since the multi-subcontracted package was difficult to track at the best of times. I understand such fiscal "fudging" is fairly commonplace within a given organizational unit (e.g., division), especially during times of exigency. Further, it may not be illegal. However, it was not right to blame me for a shortage of funds in a project where such actions were taken when I did not perpetrate them and had, in fact, attempted to stop them (documentation available). I can only presume that such an accusation was easier to "legitimize" than that of impropriety due to "unauthorized" sampling for mercury. I reiterate that information such as this is included for background only to aid the reader in interpreting a rather complex situation. I will not encumber the reader with more tangential information than deemed essential.

My brother, Dr. Larry P. Gough, is a biogeochemist with the U.S. Geological Survey (USGS) in Denver, Colorado. In this capacity he conducts research on the concentration of elements in plants from both pristine and contaminated environments. On 3 December 1981, he visited me in Oak Ridge after attending a professional meeting in Atlanta. He had hoped to combine his visit with talks with researchers at ORNL. An illness precluded the latter, slated for 4 December 1981 (Friday). On 5 December, he and I discussed the possibility of joint research which would take advantage of our collective expertise and that of our parent organizations. (We had collaborated before on scientific efforts--most recently in the preparation of a manuscript for publication). From my knowledge of the lower reaches of the East Fork Poplar Creek, attained during my work on the ORGDP EA, we concluded that the stream might be very suitable for a study of trace metal dynamics in plants. To provide preliminary data to justify the preparation of a scientific proposal (to be submitted to DOE for joint DOE (ORNL)/USGS participation), we decided to take grab samples of mosses, liverworts and sycamore rootlets found within the stream. While we suspected we might obtain some interesting values, particularly after scrutinizing the ORGDP report's sediment data, we did not prejudge the results nor was the object of our effort aimed at uncovering any "scandal".

While the data were preliminary, when they were coupled with other information (e.g., the ORGDP EA) a case could easily be made that further study was warranted on scientific grounds. Furthermore, they were so extraordinary that the question of whether any health or ecological effects were possible was automatically an issue. I stress, however, that it may be some time before the latter issue is determined; much additional data are needed. In any event, there is no reason for extreme reaction. Perhaps more important than the contamination itself is the condition which allowed it to remain a "bureaucratically sensitive" issue for years.

Attachment 3 contains a two-page report on our sampling, the methods used, the values obtained and the significance and conclusions we derived from those values. It should be noted that values were to have been obtained for other heavy metals. Before S. I. Auerbach prohibited further analysis, arsenic concentrations were determined (these appear at the bottom of a memo in Attachment 6). Arsenic appeared elevated relative to what might be expected in plant tissues in the region but not to the same degree as mercury.

A charge has recently been made that the sampling was not technically sound because I did not first consult with ORNL mercury experts such as Dr. Elwood. In reality, I had talked with him (and others) on several occasions in the course of preparing the mercury analysis for the K-25 EA. Thus, while I may not have had as much research experience in mercury contamination as some individuals, I was by no means a stranger to the subject. Furthermore, my brother, a recognized expert on levels of elements in plants, had specific expertise which was not found among the mercury experts at ORNL. As I have stated repeatedly, the values determined were preliminary; any proposal written as a result of the findings would have included input from several other individuals from ORNL, USGS and elsewhere. Undoubtedly, we would have solicited many of the same ORNL individuals referred to above to perform some of the research. Unfortunately, we were never allowed to even outline a possible proposal.

Since ORNL later used our data in their own "official" report, which was instigated by our efforts, it doesn't seem likely that UCCND really views the sampling as unofficial. To the extent that I performed the sampling on my own time and utilized, through my brother, the facilities of the USGS, the effort was unofficial. But in no way do I view the sampling and analysis as clandestine. My immediate supervisor was informed of our intentions to write a proposal well in advance of the receipt of the laboratory analysis. Additionally, the reservation is commonly used by scientists for a wide variety of environmental studies (portions are designated a National Environmental Research Park to encourage such use), and no individual charged with being creative is asked to first "O.K." all of his creative hunches before proceeding in a limited fashion. In summary, generic permission to conduct sampling of the type we performed was implicit; explicit permission to collect plants (for example, algae at the Walker Branch Watershed) had been granted one year earlier. Because of this, and other factors, the severe reaction that ensued was not at all anticipated.

Around mid-January Dr. Van Winkle (immediate supervisor) was informed of the sampling and our desire to prepare a pre-proposal, or prospectus. (He would have been told earlier but the holiday/vacation period of mid-December through mid-January intervened). His reaction was not enthusiastic. I had anticipated some encouragement due to recent comments at the division level regarding increasing cooperative research between ORNL and other institutions.

It should again be noted that I have been repeatly assured that mercury in the creek is not a national security issue. I first asked this question when I worked on the ORGDP EA and learned of the contamination. While I have been told the information is considered "bureaucratically sensitive", (see supervisor's report, Attachment 3) no one has been able to coherently define this phrase for me. I believe it refers to the public relations implications of any disclosure of the information, and the fact that some individuals may be embarrassed by its disclosure or otherwise placed in an uncomfortable position.

Results of analyses for mercury became available in late February 1982 and were passed on to my supervisor. The two-page summary of the findings was

finalized on 2 March 1982 (Attachment 3). This was given to my supervisor and a request was made that ORNL officially recognize the sampling so USGS could proceed with a cooperative effort (see draft letter to USGS from me for supervisory approval, Attachment 7). The request was denied. The reasons for the denial were not clear at the time, but they apparently followed the reasoning contained in the supervisor's report. Between this time and the end of my tenure at ORNL comments were made to the effect that the data should be kept to myself and that my brother should not divulge any information either. Dr. Van Winkle indicated that any impropriety on my part or my brother's might be countered by an action against my brother's career with the USGS. He indicated Mr. Wing (Environmental Protection Branch, DOE/ORO) had the ability to take such action. It was not clear whether Dr. Van Winkle was theorizing, and thus trying to be protective, or whether he had heard verbage to support this statement from officials above him. While neither my brother nor I felt there was any real substance to this threat, it was somewhat uncomforting. Actions taken against me were both subtle (e.g., "cold shoulder treatment") and overt (e.g., removal from position of top contender for Y-12 Environmental Coordinator position). It quickly became apparent that I should seriously look for another job. By 26 March 1982 I was ranked as one of four most likely to be terminated in a RIF from the Aquatic Ecology Section
(documentation available).

On 1 April 1982 I was removed as Project Coordinator and Co-Principal Investigator of the EPRI Legionnaires' Disease Project. The reason cited was fiscal mismanagement. This was totally unfounded since the project's financial difficulties were were due to the actions of others (see above).

On 12 April 1982 S. I. Auerbach, Division Director, called the USGS and requested the return of all material relating to the 5 December 1981 sampling. My brother indicated that Dr. Auerbach stipulated that the material be returned without a cover letter. The USGS agreed because it did not wish to provide services which were not wanted, nor did it want to possess proprietary data. However, USGS personnel who were aware of the data indicated they would not perjure themselves, and they were concerned with the perceived impropriety of ORNL.

On 20 April 1982 I was told by W. Van Winkle that I was no longer being considered for the Y-12 Environmental Coordinator position due to my involvement in the mercury "incident," despite having been the candidate of choice from the Environment Sciences Division (documentation available).

On 28 April 1982 I was verbally "reprimanded" by S. I. Auerbach for the sampling. My immediate supervisor, W. Van Winkle, was also present and prepared a synopsis of the meeting (supervisor's report, Attachment 2). One important point was not recorded. When I asked if the reaction of Auerbach and others would have been any different if the samples had been taken within the city (i.e., not on the DOE Reservation), the answer was "no." I did not feel it was necessary to respond in writing to the report.

In May of 1982 a few people from the Environmental Sciences Division were selected by management to conduct a follow-up study in response to the December 1981 sampling. As I was not allowed to participate in the effort, except to a very minor extent at the outset, the details of the sampling design and the results obtained were not known to me until very recently. I did attend an initial scoping meeting, called by W. Van Winkle, to determine whether a concensus of selected researchers agreed that further study was warranted. (Everyone in attendance strongly felt additional scrutiny was desirable). It seemed evident that the managerial motives for conducting the monitoring were not necessarily scientific.

At least one of the participants (Dr. Elwood) had tried to promote efforts similar to those discussed for the "crash monitoring program" as far back as 1977, but he reiterated that he had had very little success. He also reported on his concerns with regard to the sampling design and analytical techniques used by DOE in preparing its annual environmental reports. He mentioned a memo on the subject he prepared for S. I. Auerbach and C. R. Richmond (ORNL Assoc. Laboratory Director).

I was later asked to reenact the 5 December 1981 bryophyte/sycamore rootlet sampling, and the resulting analyses were made available to me (see Table, 6, page 42, ORNL/CF-82/257). These were the only data I was allowed to see at that time.

On 26 May 1982 I was offered another position in Fredericksburg, Virginia (my present one) and I accepted. I applied for a voluntary reduction in force (VRIF) action to take effect in two weeks. ESD management (Auerbach) requested that I stay an extra week to complete certain tasks; after consultation with my new employer, I agreed. At that point, a VRIF was approved and I was thereby promised separation pay. 18 June 1982 was my effective date of resignation.

In July 1982 I had a chance encounter with Mr. Jon Bogott, Supervisory Criminal Investigator, DOE's Office of the Inspector General (he purchased my Oak Ridge house). During the course of a conversation the subject of his job responsibilities surfaced, and I mentioned possible improprieties with regard to the handling of mercury contamination information. At the time I was not willing to provide specifics or otherwise become an "informant." On 9 September

1982 Mr. Bogott asked if I would seriously consider becoming a confidential informant. Due to previous threats, both implicit and explicit (e.g., re: my brother's career), and my preoccupation with establishing myself in a new career (etc.), I was reluctant but did accept. Mr. Bogott quickly gained my complete respect and trust as he cautiously pursued his investigation. (It now appears probable that his initiation of an investigation indirectly resulted in the disclosure of the "mercury situation," beginning with the state's acquisition of a portion of the 1982 data, and climaxing in the declassification and release of the 1977 "discharge" report).

On 13 September 1982 I called my former section head (Van Winkle) to request a copy of the report resulting from Union Carbide's May 1982 study (now known to be ORNL/CF-82/257). The request was denied on the grounds that the information was proprietary--"business confidential". While I realized the report could be accessed under the FOI Act (DOE facilities and equipment were used) I did not care to pursue the matter further.

In November 1982 I read an "Oak Ridger" article indicating the creek was to be posted. While my professional curiousity was not satisfied, much of my concern that the public was not adequately informed was diminished.

On 18 May 1983 I was asked by Mr. Bogott if I would agree to waive my right of confidentiality to enable his office to more expeditiously pursue their investigation. I agreed and also gave him authority to access my personnel file.

I am continuing to cooperate to the fullest possible extent with the Office of the Inspector General. Copies of all pertinent files, including many of tangential significance, have been given to Mr. Bogott. Thus, while I have attempted to be thorough in this testimony, it is not practical (or of likely relevance) to include all such material here. However, I would be happy to provide any additional information, if desired.

ATTACHMENT 1.

BIOGRAPHICAL SKETCH:
Dr. Stephen B. Gough
8 Norman Court
Fredericksburg, Virginia 22401

Stephen Gough received his B.S. in Biology/Chemistry (Magna Cum Laude) from Carroll College in 1972. He received his Ph.D. in Botany, Oceanography and Limnology from the University of Wisconsin-Madison in 1976. For six years thereafter he was a research biologist in the Environmental Sciences Division of Oak Ridge National Laboratory. For the past year Dr. Gough has been a software system engineer and a task leader with System Development Corporation (SDC), Fredericksburg, Virginia. He was recently named Lead Analyst for a major software system employed by the Navy and serviced by SDC.

His experience and training is broad and includes: (1) a biomedical undergraduate indoctrination: (2) course work and research in ecological sciences; (4) applied environmental work, including contributions to numerous impact analyses and the appearance as an expert witness at adjudicatory hearings; (5) research and project management in environmental health (e.g., Legionnaires' disease bacteria); (6) development of toxicological monitoring protocols for the EPA; (7) consulting and planning with regard to various water quality issues, such as nuisance plant growth, excessive nutrient problems, heavy metal inhibition of waste treatment processes, and dissolved oxygen problems; (8) the refinement of the use of indicator organisms/indices of aquatic pollution; and (9) the application of system science to complex technological and biomedical problems.

Dr. Gough holds a "Top Secret" security clearance. He is a member of several professional societies and is an author or coauthor of nearly twenty technical papers. He is a coauthor of a book on hydrologic and ecological features of the contiguous United States.

ATTACHMENT 2

UNION CARBIDE CORPORATION
NUCLEAR DIVISION

SUPERVISOR'S REPORT

DATE OF INTERVIEW

EMPLOYEE'S NAME	BADGE NO.	DEPARTMENT NO.
Stephen B. Gough	16558	ESD (42)

REASON

Collection of unauthorized samples relating to a sensitive issue

DETAILS

Gough met with S. I. Auerbach and W. Van Winkle. Auerbach initiated the meeting by asking Gough why he and his brother (Larry Gough, Branch of Regional Geochemistry, U.S. Geological Survey (USGS), Denver) had collected the samples. (The samples of concern were samples of mosses, liverworts, and willow roots collected Saturday, December 5, 1981, at three sites on East Fork Poplar Creek and one site on Bear Creek. The samples were analyzed for mercury in his brother's USGS laboratory). Gough responded that the idea came up spontaneously that Saturday when his brother was visiting. His brother's professional interests center on levels of trace metals in plant tissues, and Steve knew the East Fork Poplar Creek would be an interesting aquatic system because of his experience in preparing the K-25 EIS in 1980.

Auerbach pointed out that after being here six years he would expect an employee to know how the system works, and that he is astounded that Gough did not perceive the sensitivity of this issue. Gough responded that he did know the Y-12/Hg issue was sensitive, but that at the time he had not viewed the collection of samples as inappropriate. Auerbach responded that Gough had shown poor judgment and that the proper approach would have been to work through the system, regardless of the perceived low probability of obtaining authorization to collect such samples.

Auerbach asked Gough if he understood the message being communicated at this interview. Gough responded that he believed in working within the system and that with this "injudicious" exception he had. Auerbach pointed out that we cannot appoint ourselves as environmental policemen and that we must accept the constraints of the system, especially within the context of the policies of the sponsoring government agency.

(Continued on back of this page)

EMPLOYEE'S ACKNOWLEDGEMENT OF RECEIPT OF COPY	SUPERVISOR'S SIGNATURE
	W. Van Winkle

DISTRIBUTION: EMPLOYEE RELATIONS DEPT.
FILE
OTHERS AS REQUIRED
S. I. Auerbach
C. R. Richmond

UCN-268
1235 12-73)

Auerbach brought up the need to guard against making an a priori judgment, even subconsciously, that there is a problem in a particular situation. The analogy with leakage from low level radioactive waste pits was discussed. With both this issue and the Y-12 /Hg issue relatively extensive monitoring has not demonstrated a health problem or an ecological effects problem. However, there is a sociological problem, and thus a potential economic problem, if this type of sensitive information is handled inappropriately. With both these issues what can be said is that further study and monitoring are needed because there may be a problem on subissues about which we have insufficient information, which was Gough's primary motive in collecting the samples.

The entire interview was cordial and ended on the note that every organization has guidelines by which one is expected to function and which must be understood and accepted, even if we do not like all of them. Gough's actions constitute an unintentional "misdemeanor" and not a "felony." Some good may have been accomplished in terms of stimulating further monitoring of mercury on the reservation. However, this was the wrong means for achieving such an end, and it is not a behavior pattern to continue.

Gough apologized for the problems he had caused and assured us that this one act was not indicative of a generic inability to perceive bureaucratically sensitive situations.

ATTACHMENT 3

Collections

The results of the analyses for total Hg in samples of aquatic bryophytes (mosses and liverworts) and plant roots that we collected at sites along Bear Creek and E. Fork Poplar Creek on Dec. 5, 1981 are listed below:

	Mercury, ppm dry material		
Poplar Creek	Moss	Liverwort	Sycamore Tree Rootlets
Site 1	30	18	n.a.*
Site 4	9.0	n.a.	n.a.
Site 3	4.0	n.a.	n.a.
Bear Creek			
Site 2	n.a.	.14	.14

*n.a. means samples not available for collection.

Site 1: Approximately 400 m below the intersection of Bear Creek and Scarboro Roads. Stream shallow (<20 cm), narrow (5-6 m wide), with rocky bottom. Samples taken on east side of E Fork Poplar Creek several centimeters above present water level. Mosses and liverworts growing on both tree roots and sediments.

Site 2: Approximately 0.75 mi. south of intersection of Oak Ridge Turnpike on White Wing Rd. Bear Creek was slow moving, shallow, and narrow (2-3 m wide) with a rocky bottom. Liverwort samples were collected several centimeters above present water level on sediment. Sycamore tree rootlets were collected in shallow pools where they were submerged and suspended (not anchored in the sediment).

Site 3: Approximately 500 m below confluence of Bear Creek and E Fork Poplar Creek. Stream width ca. 8-10 m. Moss samples collected on south side about 1.5 m above present water level on limestone slabs.

Site 4: Approximately 2 mi. upstream from confluence of Bear Creek and E Fork Poplar Creek just north of Oak Ridge Turnpike near bridge over E Fork Poplar Creek. Stream width ca. 8-10 m. Samples taken several centimeters above present water level on tree limbs and roots.

Methods

All samples were prepared for Hg analysis as follows:

1. Soaked over night in tap water.
2. Picked clean by hand--removal of sediment and extraneous plant material.
3. Rinsed in running tap water (material recovered on a stainless steel screen).
4. Twice rinsed in distilled water.
5. Dried in a forced-air oven for 24 hrs. at about 35°C.
6. Ground in a Wiley mill to pass a 1.3 mm screen.

7. Digested with nitric, sulfuric, and perchloric acids under reflux.
8. Stannous chloride added to digestate to reduce the Hg to its elemental state.
9. Mercury swept from solution by air into an absorption cell attached to an atomic absorption spectrophotometer.

Concentrations of Cd, Pb, and As in these samples are also being determined.

Significance and Implications

The mercury levels found in the moss and liverwort samples collected along E Fork Poplar Creek are large and can be considered very unusual. The 30 ppm concentration obtained for the moss sample from Site 1 was the largest ever measured in plant material in our Plant Laboratory. This moss sample, as well as the liverwort sample from the same site, yielded the same high concentrations when re-analyzed. Studies by botanists in our Branch over the years have shown that plant material usually contains <1 ppm (1,000 ppb) Hg and levels of <0.07 ppm (70 ppb) are common. For example, the range of Hg concentrations in big sagebrush samples at 190 sites throughout its distribution in the western U.S. was 0.01-0.06 ppm. Mercury values of about 3.5 ppm have been found in shrub samples that were rooted in a cinnabar deposit in northern Canada and recently a Hg concentration of 7 ppm was recorded in a bryophyte sample from a mineralized region in Nevada.

The Poplar Creek values thus are of interest because of their extreme nature in a region where Hg deposits are not known. It would appear that an anthropogenic point source for Hg is the most reasonable explanation for such large concentrations. A pronounced gradient in Hg levels occurs with the largest values near the headwaters (Site 1) and progressively decreasing values going downstream. The values for liverwort in Bear Creek, although large compared to plants in general, are much smaller than those in samples from Poplar Creek.

A few of the scientific questions that come to mind follow:

1. What is the source and form of the Hg?
2. Is the Hg being concentrated anywhere in the foodchain?
3. What physical, chemical, or biological processes are mobilizing the Hg?
4. Are any other metals present in large concentrations?
5. Are aquatic vascular plants also concentrating Hg?
6. Assuming a cessation of the Hg contamination, how much time would be required for the stream vegetation to approach background levels?

ATTACHMENT 4

This attachment includes
excerpts from this document.

DOE/EA-0106

ENVIRONMENTAL ASSESSMENT OF THE OAK RIDGE GASEOUS DIFFUSION PLANT SITE

December 1979

Oak Ridge Gaseous Diffusion Plant
Oak Ridge, Tennessee

TECHNICAL INFORMATION CENTER
UNITED STATES DEPARTMENT OF ENERGY

ENVIRONMENTAL ASSESSMENT OF THE OAK RIDGE
GASEOUS DIFFUSION PLANT SITE

Sections and Pages Pertinent to Y-12 Mercury Issue.

SECTION	PAGE
1.6 Unavoidable Adverse Environmental Effects	1-4
4.4.1.3 Water Quality	4-18
4.4.1.4 Sediment Quality	4-19
4.4.1.5 Water Use	4-21
5.2.2 Aquatic	5-15, 5-16, 5-17, 5-20, 5-22
10.1 Costs	10-1
10.4 Trade-off Discussion	10-14
11 List of Preparers	11-1, 11-2, 11-3

Electric power (about 2080 MWe consumed in 1984) is supplied by the Tennessee Valley Authority. About 6.6% of TVA's generating capacity is committed for use by ORGDP. Since specific dedicated plants do not supply this power, the environmental impacts of supplying ORGDP power are considered a proportion of the total environmental impact of the operation of the TVA network of hydroelectric, coal, and nuclear generating facilities. Based on the projected mix of TVA generating facilities for 1984, the facility breakdown will be about 300 MWe hydroelectric, 1200 MWe coal, and 1050 MWe nuclear.

A 300-MWe hydroelectric generating facility would likely inundate about 550 acres of land, resulting in associated land-use changes and the disturbance of associated terrestrial and aquatic biota.

Impacts from a 1200-MWe coal-fired generating facility result from mining, transportation, storage, combustion, and waste disposal. Typically, 400 acres of land is used for the coal-fired facility and 150 acres/year for surface mining (assuming the coal is supplied by surface mining of eastern coal). A possible 700 acre-ft of water is required annually in surface mining. Approximate amounts of pollutants discharged to the atmosphere (assuming the plant conforms to New Source Pollutant Standards) annually would be: SO_2, 28,000 tons; NO_x, 16,000 tons; particulates, 2000 tons; hydrocarbons, 3000 tons; CO, 1000 tons; lesser amounts of various metals; and about 23 Ci of radioactivity. These pollutants cause adverse health effects, primarily to the human respiratory system. Transportation of the coal from the mines to the generating plant causes increased traffic on the highways and railroads, resulting in increased accident potential, as well as increased emission from the internal combustion engines. Streams are polluted from surface mining operations, coal piles, and ash pits.

A 1050-MWe nuclear facility would require about 1500 to 2000 acres of land for the plant (250 acres) and buffer zone. About 5000 acre-ft of water is consumed annually, and terrestrial impacts result from cooling tower drift. As with coal mining, land is disturbed for uranium mining. Environmental issues related to uranium milling are sulfate emissions, low-level radiological releases, mill tailings disposal, and water consumption. The radiation dose to the surrounding population from the radioactivity released in nuclear plant effluents would increase possibly 2% over natural background levels.

The effects of potential accidents are evaluated. In the scenario where the entire contents of a 14-ton cylinder of UF_6 is released to the atmosphere within a 15-min time span, calculations show that lethal concentrations of HF could exist in the parking lot (open to the public) for a period of time. The concentration of HF would be 2300 mg/m^3; 1000 mg/m^3 is lethal. The radiation dose from the uranium released could result in a dose of 65 rem to the total body and 750 rem to the bone. The rupture of an anhydrous hydrofluoric acid storage tank could release twice as much HF to the atmosphere as the 14-ton UF_6 cylinder. All other accidents considered are more than an order of magnitude less severe.

1.6 UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

Unavoidable adverse environmental impacts of ORGDP operation that may occur on the Oak Ridge Reservation near the plant are primarily a function of air quality deterioration. Under severe meteorological conditions, Tennessee ambient air quality standards for HF may be exceeded near the plant. Cooling tower plumes are visible offsite, and they occasionally touch the ground. The frequency of ground-level fogging along Tennessee Highway 58, adjacent to ORGDP, is estimated to be 16% greater than the frequency of fogging without plant operation.

✓ The operation of ORGDP contributes to the chemical loading of Poplar Creek and the Clinch River. During periods of low flow or no flow, severe local aquatic impacts (toxicity, eutrophication) may occur, but the effects from such episodes should be transient, with the possible exception of increased heavy-metal body burdens in aquatic biota.

Operation of the plant through the year 2000 will use 20 acres of land for landfill disposal of radioactively contaminated wastes and 2 acres for sanitary wastes.

The total population living within 50 miles of ORGDP receives a total-body radiation dose of 0.044 man-rem/year. This is only about 0.00006% of the dose received by the population from natural background. Maximum-dose estimates for offsite individuals at the boundary fence 4 km SW of the plant are 0.0037 millirem/year for the total body and 0.00023 to 0.041 millirem/year for body organs. This does not add significantly to the individual's annual radiation dose from natural sources.

4.4.1.3. (Cont.)

Table 4.8. Water quality data for selected parameters measured at three Clinch River stations[a,b] upstream of ORGDP sanitary water intake

Parameter	Concentration (mg/liter)								
	Transect 1, station 5			Transect 4, station 3			Transect 5, station 5		
	Mean	Minimum	Maximum	Mean	Minimum	Maximum	Mean	Minimum	Maximum
Total alkalinity, as $CaCO_3$	96	76	114	98	76	116	93	76	106
Hardness (total), as $CaCO_3$	112	96	136	115	88	138	111	82	136
Calcium[c]	N.A.[d]	N.A.	N.A.	33.5		43.0	N.A.	N.A.	N.A.
Magnesium[c]	N.A.	N.A.	N.A.	7.8		8.5	N.A.	N.A.	N.A.
Iron (total)[c]	N.A.	N.A.	N.A.	0.38	0.08	0.68	N.A.	N.A.	N.A.
Chloride	5.0	2.6	13.0	4.7	2.0	11.0	4.6	1.0	10.0
Potassium	1.4	1.1	1.7	1.4	1.1	1.9	1.3	1.1	1.6
BOD	2.1	0.3	6.0	1.8	0.9	3.0	2.2	<1.0	3.4
Total organic carbon	4.0	1.0	10.0	4.5	1.0	9.0	3.2	1.0	6.0
Phosphorus[e]									
Ortho PO_4^{3-}-P	0.026	<0.003	0.120	0.013	<0.003	0.060	0.015	<0.003	0.100
Total PO_4^{3-}-P	0.041	<0.003	0.130	0.049	<0.003	0.230	0.064	<0.003	0.350
Nitrogen[e]									
NO_2^--N	0.010	<0.001	0.068	0.010	<0.001	0.062	0.001	<0.001	0.065
NO_3^--N	0.010	<0.001	0.068	0.010	<0.001	0.062	0.001	<0.001	0.065
NH_3-N	0.2	0.1	0.5	0.3	0.1	0.5	0.2	0.1	0.5

[a] Data were collected from March 1974 through April 1975.

[b] Transect and station locations are shown in Fig. 1.4-1 of source note 2 (see below).

[c] Samples were only taken in March and September 1974 at transect 4, station 3.

[d] N.A. = data not available.

[e] For calculation of mean values, levels under the limit of detection were considered to represent one-half the detection limit value.

Sources:

1. Project Management Corporation and the Tennessee Valley Authority, *Clinch River Breeder Reactor Project Environmental Report*, Construction Permit Stage, Docket No. 50-537, Apr. 2, 1975, Tables 2.7-32 and 2.7-35.
2. James M. Loar et al., *Environmental Analysis Report for the Oak Ridge Gaseous Diffusion Plant*, ORNL/TM-6714, Oak Ridge National Laboratory, Oak Ridge, Tenn. (in preparation).

Ammonia concentrations in the Clinch River and Poplar Creek at times exceed recommended levels for the protection of aquatic biota. The presence of the toxic unionized form depends strongly on pH; little is present at pH values below 7. At pH 8.3 (the maximum recorded in the vicinity; see Table 4.7), 10% of the ammonia is NH_3.[20] Under such conditions, the criterion for the protection of aquatic biota[21] of 0.02 mg/liter would be exceeded at most of the stations listed in Table 4.7. The implications of this for the aquatic biota, as well as the effects of other potential toxicants found in the area's waters, are discussed in Sects. 5.2.2, 5.3.3, and 5.3.4.

✓ Mercury in the water was found in concentrations significantly above background (Table 4.7) at all area sites (Fig. 2.14) sampled during the ORGDP monitoring program.[15] Levels of up to 0.003 mg/liter were recorded; background concentrations in this area should not exceed 6×10^{-5} mg/liter (0.06 μg/liter).[22] The mean concentrations at all the stations are below the detection limit used in the available studies (0.001 mg/liter), but this level is above the current standard for the protection of aquatic biota — 5×10^{-5} mg/liter (0.05 μg/liter).[21] Thus, average concentrations at the sampling stations may exceed the water quality standard.

Of the eight other heavy metals analyzed in the available studies, only zinc was found to occur in concentrations potentially harmful to biota (Sects. 5.2.2 and 5.3.3).

PCB concentrations were determined at five locations in Poplar Creek and the Clinch River; all values were below the 0.0005-μg/liter limit of detection.[15] Concentrations below 0.001 μg/liter are not believed to significantly affect aquatic biota.[21]

4.4.1.4 Sediment quality

Several studies of heavy-metal concentrations in sediments were conducted in the vicinity of ORGDP.[15] Table 4.9 summarizes the data from the most complete evaluation. (The sampling locations are shown in Fig. 4.5.) The data for many of the elements display a high degree of variability — both in differences among sampling sites and among sampling dates. For some of the parameters, analytical methods were changed during the course of the investigation, thereby potentially altering the precision and accuracy of the determinations. For comparison, a compilation of published values representative of largely uncontaminated areas is provided in Table 4.10. Likewise, Table 4.11 lists mercury concentrations in various sediments, from both contaminated and relatively pristine locations.

✓ Cadmium levels in the sediments near ORGDP may be elevated above concentrations expected in an uncontaminated environment (cf. Tables 4.9 and 4.10), but the precise concentration of cadmium cannot be determined from the data because the detection limit of the analytical method used was 5 μg/g dry weight. Chromium concentrations appear to be elevated (at least, at some sampling locations), as do levels of the other heavy metals measured (copper, lead, manganese, mercury, nickel, and zinc). All these metals currently are discharged at one or more locations at ORGDP (Sect. 2.2.3.3). The mercury values are particularly noteworthy — some of the concentrations found are up to five orders of magnitude greater than those found in relatively pristine areas and up to two orders of magnitude greater than values determined for other contaminated locations (cf. Tables 4.9, 4.10, and 4.11). For example, the highest reading, from a Poplar Creek sample, was 307 μg/g (dry weight); for comparison, an uncontaminated British stream was 0.03 to 0.17 μg/g, and the heavily polluted Rhine River was 6.90 μg/g. More than 80% of all sediment samples from the mouth of Poplar Creek to its confluence with the East Fork of Poplar Creek had mercury levels >1.0 μg/g; more than 33% had values >10 μg/g. However, sediment concentrations varied greatly among sampling sites on a particular sample day and among sampling dates at a given site. Sections 5.2.2 and 5.3.3 contain additional information on mercury distribution, as well as a discussion of the potential impacts of elevated mercury levels. It is believed that the source of current mercury levels in the ORGDP area of Poplar Creek results from past operations at Y-12.[23]

Data on sediment concentrations of polychlorinated biphenyls (PCBs) indicate that levels in Poplar Creek are higher than in the Clinch River. A 1974 study of six stations on Poplar Creek revealed levels ranging from 6 to 15 μg/g ($\overline{X}$ = 11 μg/g), although another survey (of different stations) reported concentrations that were roughly an order of magnitude smaller.[15] In comparison, nearly all values for Clinch River sediment samples were <0.1 μg/g, and a few were <0.001 μg/g. PCB effects on biota are discussed in Sect. 5.2.2.

4.4.1.5 Water use

The ORGDP currently takes about 12 Mgd (19 cfs) of water from the Clinch River for makeup cooling water; this will be increased to about 20 Mgd (31 cfs) by 1984 (Sect. 2.2.3.3). The sanitary water demand is about 4 Mgd (6 cfs) and is not expected to increase substantially over the next few years. These withdrawals, taken at Clinch River Mile (CRM) 11.5 and 14.4, respectively, would be (in 1984) only about 6% of the seven-day, ten-year low flow and only about 1% of the average flow. Additionally, about 25% of the water will be returned to the river as treated sewage or as blowdown water. Currently, no withdrawals are made from Poplar Creek, although several effluent release points are located on it (Sect. 5.3.3).

Other industries and municipalities in the vicinity of ORGDP that use water from the Clinch River include DOE Oak Ridge Operations (ORNL and Y-12 Plant) and the city of Oak Ridge (22 Mgd at CRM 41.5) and the TVA Bull Run Steam Plant (572 Mgd at CRM 47.6).[2] All are upstream from ORGDP.

The Clinch River (including Melton Hill and Watts Bar reservoirs) adjacent to the reservation is a component of the Inland Waterway System, which allows commercial navigation to the Gulf of Mexico. Commercial traffic locked through Melton Hill Dam amounted to 3000 tons (2720 metric tons) in 1975. In 1974, 631 recreational craft passed through the Melton Hill locks.[14]

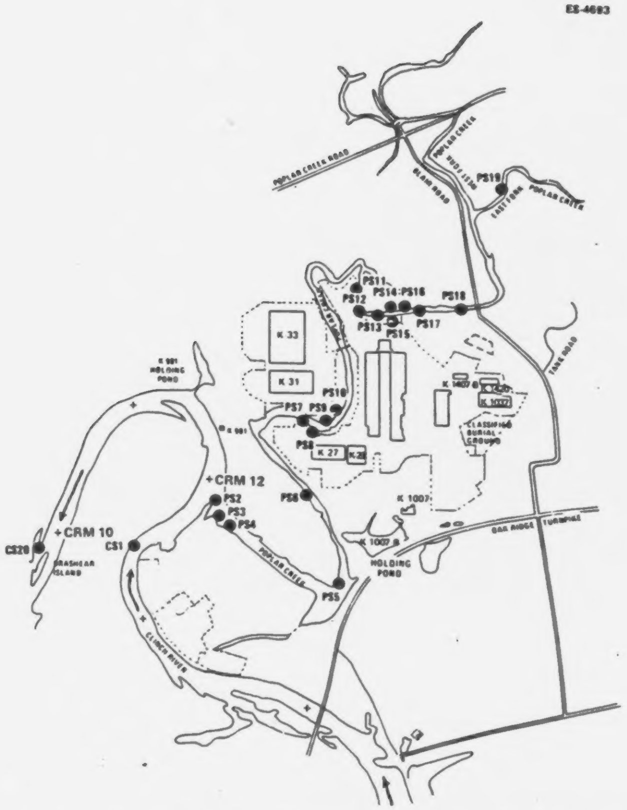
ES-4693
POPLAR CREEK ROAD
POPLAR CREEK
BLAIR ROAD
HWY 58
PS19
EAST FORK POPLAR CREEK
PS11
PS12
PS14
PS16
PS18
PS13
PS15
PS17
TANK ROAD
K 33
K 31
K 901 HOLDING POND
PS10
PS7
PS9
PS8
K 27
K 29
K 901
K 1407
K 1420
K 1037
CLASSIFIED BURIAL GROUND
+CRM 12
PS2
PS3
PS4
PS6
K 1007
K 1007 B
HOLDING POND
OAK RIDGE TURNPIKE
+CRM 10
CS20
CS1
BRASHEAR ISLAND
POPLAR CREEK
PS5
CLINCH RIVER

Fig. 4.5. Surface-water sediment sampling stations surveyed in July and November of 1976 and 1977 for aluminum, cadmium, chromium, copper, lead, manganese, mercury, nickel, and zinc. Source: James M. Loar et al., *Environmental Analysis Report for the Oak Ridge Gaseous Diffusion Plant*, ORNL/TM-6714, Oak Ridge National Laboratory, Oak Ridge, Tenn. (in preparation).

✓ Recreational use of the waters in the Oak Ridge area is heavy. Although no quantification of the activities is available, swimming, fishing, and localized recreational boating are very popular. The Clinch River and its reservoirs are primarily used for these sports, but smaller tributaries (such as Poplar Creek) are frequently fished (Fig. 2.14).

4.4.2 Groundwater

The migration of radioactive or other contaminants by groundwater movement is an environmental concern resulting from the operation of ORGDP. Under certain conditions, transport over large distances can occur in groundwater, and groundwater can also become a means by which contaminants are transmitted to surface streams. The three basic parameters that affect groundwater movement are hydraulic gradient, permeability, and aquifer length.

the withdrawals currently are 2.5% of the flow; the 1984 value will be 3.7%. Since peak ichthyoplankton densities occur in the late spring,[45] when river flows are generally high, it is unlikely that these latter values will ever be reached during the time when the ichthyoplankton community is most vulnerable. Moreover, the data of Loar et al.[45] suggest that (1) tributary streams have much greater densities of ichthyoplankton than the Clinch River itself and that most entrainable larvae remain in the tributaries and (2) ichthyoplankton in the river below Poplar Creek in the vicinity of the intake are largely homogeneously distributed, thus lessening the probability that any high concentrations of larvae ever exist near the intake.

Impingement impacts. The water velocity at the trash racks of the intake is currently about 0.1 fps. At this velocity, little debris collects on the traveling screens, and the screens are therefore only run sporadically. No record of impinged fish exists.[46] In the 1984 operating mode, the approach velocity will increase to about 0.2 fps. Although a few fish may be impinged under these conditions, losses are not expected to be severe. In several cases, approach velocities of <0.5 fps have been found adequate to avert substantial impingement losses.[47,48] Moreover, the swimming speeds of the nonentrainable fish found in the area are likely to be greater than the approach velocity, even in the winter.[49-51]

Thermal impacts. Because of the small volume of water affected by thermal discharges (Sect. 5.3.4), it is not likely that any significant aquatic ecological impacts will occur from the operation of ORGDP. Highly localized impacts that may occur include (1) phytoplankton community composition changes, (2) inhibition or stimulation of photosynthesis (depending on the season and the algal species present) and enhancement of respiration/decomposition, (3) attraction of fish during the colder months, and (4) cold shock of fish during power cutbacks. None of these potential effects is likely to be discernible outside a small area since the largest discharge (cooling tower blowdown) only creates a detectable plume that is a maximum of 60 x 40 x 3 ft (18 x 12 x 0.9 m). Moveover, the ΔT at the discharge point is only 1.7° to 3.3°C (3° to 6°F) (Sect. 5.3.4). In comparison with those of most power-generating facilities, this is a low discharge ΔT, and the plume that is produced is much smaller than that produced by most power plants.[52]

No significant change in the characteristics of the thermal discharges is anticipated for 1984 operation of the facility (Sect. 5.3.3).

✓ Impacts of chemical discharges. Although ORGDP operation has had, and continues to have, a significant effect on the chemical loading of Poplar Creek and the Clinch River, much (if not most) of the serious contamination of these water bodies appears to be derived from upstream sources. The Poplar Creek Watershed receives effluent from coal mining areas, sewage treatment facilities, and the Y-12 Plant. The latter, in particular, is suspected of producing most of the stream burden of mercury near the ORGDP site.

Potential eutrophication impacts induced by the sewage effluents and nitrate discharges in the process wastewater are discussed in Sect. 5.3.3.

As indicated in Sect. 5.3.3, some of the constituents in the effluents are at concentrations that would be toxic to biota if the waste streams were undiluted,[53,54] as might be found in localized areas during periods of zero flow (Table 5.15). Some of these substances occur at concentrations several orders of magnitude greater than the criterion for protection of aquatic biota (e.g., nickel, zinc, and residual chlorine). Thus, significant degradation of the biotic communities could be expected in portions of Poplar Creek and the Clinch River during this worst-case situation. Possible effects include (1) acute and/or chronic toxic effects induced by the parameters listed in Table 5.15, except for dissolved solids and sulfates, (2) community composition changes (especially in phytoplankton, periphyton, and zooplankton) caused by osmotic shifts from the dissolved solids and sulfate additions; and (3) increased bioaccumulation of heavy metals.

Two proprietary chemicals in the effluent at ORGDP discharge location 1 (Betz Polynodic 562 and Betz 35A; Table 2.8) are of unknown toxicity. These chemicals are essentially polyphosphonates, which are thought to be readily degraded. Because the blowdown becomes greatly diluted, the levels of these compounds would not be expected to become significant except in the immediate discharge area.

✓ The frequency of occurrence of zero flows at the ORGDP site is unknown, as is the size of each plume that would be produced by each discharge under no-flow conditions. Thus, it is not possible to quantify the impacts that would occur. Under average flow conditions (Poplar

Table 5.15. Effluent concentrations (1978 operation) at ORGDP discharge locations

Parameter	Protection criterion[a] (mg/liter)	Maximum monthly discharge concentration[b] (mg/liter)							
		Discharge location No.[c]							
		1	2	3	4	5	6	7	8
Ammonia[d]	0.02[e]				0.51				
Cadmium	4×10^{-4}[f]						0.005		
Chlorine (total residual)	0.002				2.0	2.0			
Copper	~0.020[g]		0.50	0.50			0.12		
Cyanide	0.005	0.007		0.006			0.007		
Dissolved solids	h	900	4000	820					
Lead	~0.050[g]		0.07						
Manganese	1.5[i]		2.6						
Mercury	5×10^{-5}	0.004	0.004				0.002		
Nickel	0.005[g]	1.86	2.5	0.800			0.15		
Sulfate	h	500	1200	610			2100		320
Zinc	1×10^{-4}	1.2		0.10			0.50		

[a] U.S. Environmental Protection Agency, *Quality Criteria for Water*, EPA-440/9-76-023, 1976.

[b] Value given only if in excess of protection limit.

[c] Discharge locations are shown in Fig. 2.1.

[d] Unionized NH_3 concentration at maximum reported pH.

[e] In the unionized form.

[f] For sensitive organisms (e.g., cladocerans) in soft water.

[g] Based on $0.1 \times$ 96-hr LC_{50}, using a sensitive aquatic species.

[h] A concentration that does not induce changes in community composition.

[i] Minimum tolerance value for a sensitive organism.

Creek, 200 cfs; Clinch River, 4800 cfs) all the parameters would be reduced (outside the mixing zones) to levels unlikely to harm the biota, with the exception of mercury, zinc, and nickel. These metals occur at sufficiently high average and maximum background concentrations (Tables 2.8 through 2.12 and Table 4.7) to potentially induce toxic effects without the ORGDP additions. Mercury, in particular, has been found at highly elevated levels upstream in Poplar Creek (up to 2 μg/liter). Thus, additions from ORGDP will potentially exacerbate any toxic effects that may already be occurring.

✓ Analyses of sediment and fish tissue are potentially useful indicators of the long-term degradation occurring in an environment from heavy-metal inputs. Sediment analyses conducted in the area are reported in Sect. 4.4.1.4. Interpretation of the results of these analyses is somewhat difficult because (1) the precision of many of the tests is low, especially at lower concentrations;[55] (2) sediment texture and organic content can greatly affect metal absorption and retention;[56] and (3) downstream migration of the metals ordinarily occurs with time, complicating a determination of contaminant sources. Furthermore, sediment Eh and pH, which can be quite variable within a given habitat,[57] affect metal retention.[58] Despite these facts, all the heavy metals examined (cadmium, copper, lead, manganese, mercury, nickel, and zinc) appear to be elevated in the vicinity of ORGDP, with the possible exception of cadmium (Sect. 4.4.1.3). Mercury concentrations are substantially greater than those expected in pristine areas (see discussion in Sect. 4.4.1.3). The extent to which ORGDP discharges contribute to the sediment metal burden is as yet unknown. An examination of Table 4.9 indicates that sediment values are high upstream of the facility (station 19; mouth of the East Fork of Poplar Creek).

✓ The results of a 1977 study of trace substances in fish tissues in the vicinity of ORGDP are discussed in detail in ref. 45. In this analysis of 362 fish (including 15 species), only mercury and polychlorinated biphenyls (PCBs) were found at levels indicating contamination (Tables 5.17 through 5.22). Table 5.16 lists selected mean concentrations of trace elements in fish (in relatively uncontaminated areas, as determined by various investigators), and Tables 5.17 through 5.22 give data on the tissue concentrations found at various stations in the Clinch River and Poplar Creek. Generally, migratory species that enter Poplar Creek to spawn had the

Table 5.16. Trace element concentrations in fish — from selected studies

Element	Concentration (μg/g)				
	Lake Erie	Great Smoky Mountains National Park	Great Lakes (Michigan, Superior, and Erie)	Lake Cayuga, N.Y.	Wintergreen Lake, Ill.
Mercury	0.522	0.036			0.18
Lead				0.011	0.329
Cadmium	0.055		0.09	0.04	0.037
Zinc	14.2		1.3	0.21	
Copper	1.08			0.02	
Chromium	0.23		1.0	0.016	
Nickel				0.014	

Source: James M. Loar et al. *Environmental Analysis Report for the Oak Ridge Gaseous Diffusion Plant*, ORNL/TM-6714, Oak Ridge National Laboratory, Oak Ridge, Tenn. (in preparation).

Table 5.17. Mean concentrations of metals and PCBs in fish collected from station PCM 11.0, spring 1977

	Concentration (μg/g wet weight)							
	Hg	Pb	Cd	Zn	Cu	Cr	Ni	PCBs
White bass	0.17 ± 0.008	0.21 ± 0.02	0.008 ± 0.001	5.0 ± 0.5	0.6 ± 0.06	0.09 ± 0.02	0.5 ± 0.04	0.4 ± 0.06
Gizzard shad	0.04 ± 0.002	0.13 ± 0.02	0.007 ± 0.001	4.0 ± 0.3	0.8 ± 0.1	0.16 ± 0.07	0.6 ± 0.1	0.3 ± 0.05
Bluegill	0.10 ± 0.03	0.09	0.023 ± 0.004	8.0 ± 1.4	0.5 ± 0.1	0.29 ± 0.11	0.6 ± 0.2	0.3

Source: James M. Loar et al., *Environmental Analysis Report for the Oak Ridge Gaseous Diffusion Plant*, ORNL/TM-6714, Oak Ridge National Laboratory, Oak Ridge, Tenn. (in preparation).

lowest tissue levels (e.g., gizzard shad and white bass), and resident bottom feeders and top carnivores in the creek had the highest levels. More than 14% of the game fish from Poplar Creek and the Clinch River had muscle tissue mercury concentrations in excess of 0.5 μg/g, whereas 2% of the game fish from all six sites had mercury levels exceeding 1.0 μg/g, the action level on mercury in fish recently recommended by the U.S. Food and Drug Administration (FDA). A largemouth bass from station PCM 5.5 had the highest mercury concentration (2.14 μg/g wet weight) of all the fish collected.

Significant seasonal differences ($p < 0.05$) in tissue concentrations of mercury were found in largemouth bass and *Lepomis* sp. (probably bluegill). Thus, either different populations of fish of these species were sampled, or the same populations were exposed to greater levels of mercury during the season when the highest tissue levels occurred. Differences in available mercury could have resulted from increases in effluent releases into the water column, or additional mercury may have been mobilized from the sediments.[59]

The data indicate that many of the fish have tissue mercury concentrations that exceed a recognized FDA criterion, above which human consumption is not recommended. However, a previous study[60] suggests that the mercury that is contaminating fish comes primarily from sources upstream of ORGDP (in the East Fork of Poplar Creek and in Bear Creek).

Table 5.20. Mean concentration of metals and PCBs in fish collected from station CRM 15.0, 1977

	Concentration (μg/g wet weight)												
	Hg		Pb		Cd		Zn		Cu		Cr	Ni	PCBs
	1[a]	2[b]	1	2	1	2	1	2	1	2	1	2	1
White bass		0.04 ± 0.005		0.12 ± 0.01		0.016 ± 0.003		8.0 ± 0.5		0.3 ± 0.10			
Gizzard shad	0.07 ± 0.01		0.05 ± 0.002		0.008 ± 0.001		2.0 ± 0.1		0.6 ± 0.1		0.36 ± 0.08		0.5 ± 0.2
Lepomis sp.		0.53 ± 0.11		0.08 ± 0.006		0.009 ± 0.001		12.0 ± 0.4		0.3 ± 0.01		0.6 ± 0.03	
Largemouth bass		0.21 ± 0.05		0.19 ± 0.03		0.026 ± 0.004		6.0 ± 0.4		0.1			

[a] 1 = fish collected in the spring.

[b] 2 = fish collected in the fall.

Source: James M. Loar et al., *Environmental Analysis Report for the Oak Ridge Gaseous Diffusion Plant*, ORNL/TM-6714, Oak Ridge National Laboratory, Oak Ridge, Tenn. (in preparation).

Table 5.21. Mean concentration of metals and PCBs in fish collected from station CRM 11.5, 1977

	Concentration (μg/g wet weight)							
	Hg	Pb	Cd	Zn	Cu	Cr	Ni	PCBs
Gizzard shad	0.10 ± 0.01	0.32 ± 0.05	0.020 ± 0.006	9.0 ± 1.5	0.8 ± 0.4	0.04 ± 0.003		
Shad	0.05 ± 0.005	0.10 ± 0.01	0.014 ± 0.008	4.0 ± 0.4	0.6 ± 0.05	0.10 ± 0.03	0.7 ± 0.2	0.4 ± 0.06
Lepomis sp.	0.49 ± 0.14	0.30 ± 0.02	0.014 ± 0.001	11.0 ± 1.4	0.4 ± 0.03	0.04 ± 0.005		

Source: James M. Loar et al., *Environmental Analysis Report for the Oak Ridge Gaseous Diffusion Plant*, ORNL/TM-6714, Oak Ridge National Laboratory, Oak Ridge, Tenn. (in preparation).

Tissue concentrations of PCBs in the fish were also determined because elevated sediment values were found (Sect. 4.4.1.4). Most of the fish analyzed had concentrations below the FDA action level of 5 μg/g. However, concentrations near this level were found in the ten channel catfish collected in Poplar Creek. Two fish had levels as high as 6.0 and 7.0 μg/g, but the highest body burden — 8.5 μg/g — was found in a longnose gar from the creek.

✓ The source of PCB contamination is unknown. No PCBs of the same chemical composition as those found in the area have been used by ORGDP in recent years; data are lacking on what compounds may have been discharged before this time.[61] Although sediment levels are lower upstream of the facility, downstream migration of the compounds from an upstream source is highly possible.

✱ ✓ The physical and chemical milieus of the waters near ORGDP (especially Poplar Creek) suggest that the biotic communities within them are under stress. The stressors are many and varied — turbidity, allochthonous sediment (especially coal fines), heavy metals and other toxicants, degradable organic matter, excessive nitrogen and phosphorus, altered flow regimes, altered water temperatures. Despite this, functioning communities exist and, in some cases, thrive. Thus, a phytoplankton, zooplankton, and periphyton assemblage fairly typical of North American rivers exists (Sect. 4.6.2), and Poplar Creek apparently serves as a major spawning and nursery ground for fish. However, some changes in community and ecosystem structure and function undoubtedly have occurred as a result of these anthropogenic disturbances. Moreover, stressed systems are highly susceptible to the effects of additional perturbations. It is therefore advantageous to curb, where possible, the input of existing or additional factors that may affect the biota of Poplar Creek and the Clinch River. Moreover, the potential health effects resulting from the consumption of mercury- and PCB-laden fish caught in the area dictates careful monitoring of contaminant levels. Also, upstream sources of mercury and PCBs need to be determined and evaluated, with the aim of reducing their effects. An assessment of Y-12 operations (in preparation) will give additional information on upstream sources.

Radiation dose to aquatic biota. Doses to aquatic plants, to invertebrates, and to fish and waterfowl that live in the receiving water bodies below effluent discharge regions have been calculated. These doses are due to water intake and ingestion by organisms living in water bodies that receive the liquid effluent. The discharge-region concentrations were calculated from average annual radionuclide releases and from average annual flows for the receiving water bodies (see Table 5.9).

All dose calculations were based on the assumption that the radionuclide concentrations in water remain constant and that the biota reach a steady-state concentration where the input of radioactive material to the environment is constant. The organisms are assumed to spend all year in Poplar Creek water that has the maximum concentration of discharged radionuclides. All calculations were completed by use of adaptions of standard models and procedures for estimations of radiation dose (see ref. 6). However, the doses are probably conservative, since it is highly unlikely that any of the mobile life forms spend a significant portion of their life span at the site of maximum concentration of radioactivity.

Tables 5.23 and 5.24 list the radiation doses calculated for organisms living in or near the discharge of liquid effluents from ORGDP into Poplar Creek. Aquatic plants and invertebrates are estimated to receive the highest internal doses, which are mainly attributable to uranium-234.

Table 5.23. Estimated annual internal dose resulting from liquid effluents to biota that live in Poplar Creek at the ORGDP boundary

Radionuclide	Concentration (μCi/ml)	Dose (millirads)			
		Algae	Invertebrates	Fish	Waterfowl or muskrats
Tc-99	1.5E−8[a]	1.0	1.3E−1	3.9E−1	7.6E−2
U-234	9.6E−10	8.8E2	8.8E1	8.8	1.2
U-235	4.6E−11	3.9E1	3.9	3.9E−1	5.5E−2
U-236	1.5E−11	1.3E1	1.3	1.3E−1	1.8E−2
U-238	6.6E−10	5.3E2	5.3E1	5.3	7.4E−1
		1.5E3	1.5E2	1.5E1	2.1

[a] Read as 1.5×10^{-8}.

The significance of these estimated radiation doses to biota other than man is not immediately known. The literature on radiation effects on organisms is extensive, but very few studies have been conducted to determine the effects of continuous low-level exposure to radiation from ingested radionuclides on natural aquatic or terrestrial populations. The most recent pertinent studies point out that, whereas the existence of extremely radiosensitive biota is possible and increased radiosensitivity in organisms may result from environmental interactions, no biota have yet been discovered that show more sensitivity to radiation exposure than those found in the area surrounding ORGDP. The BEIR report states, in summary, that evidence to date indicates that no other living organisms are very much more radiosensitive than man.[62]

10. TRADE-OFF ANALYSIS

Operation of the Oak Ridge Gaseous Diffusion Plant (ORGDP) can be categorized in terms of a trade-off between local environmental and socioeconomic costs and socioeconomic and technological benefits, which have local and national impact.

10.1 COSTS

Environmental costs are summarized (Table 10.1) according to:

1. impacts from the existence and operation of ORGDP and the offsite power plants that serve it, transmitted via natural water bodies, the air, and the land
2. consumption of natural resources

✓ In general, there is no manifestation of major environmental costs to the Oak Ridge area caused by the operation of ORGDP. Most of the aquatic impacts measured have been relatively small (Table 10.2). High concentrations of mercury and polychlorinated biphenyls (PCBs) in the sediment of the Clinch River and Poplar Creek are probably not attributable to ORGDP. Atmospheric impacts are small and only locally effective even when potential air quality deterioration from fluorine, sulfur dioxide (SO_2), and cooling-tower drift emissions has been considered.

✓ The socioeconomic costs associated with ORGDP should be viewed within the context of the socioeconomic environment brought about by the presence of the entire federal complex at Oak Ridge. The three local entities predominantly affected by this complex are Anderson and Roane counties and the city of Oak Ridge. When the federally created community of Oak Ridge was established as part of the Manhattan Engineer District program, the two counties felt the impacts of the wartime influx of workers and their families, thousands of daily commuters to the project, and the shortages of manpower and financial resources with which to respond to the new burdens.

Population increases in the early years of the federal project were dramatic for Anderson County and for what came to be the Oak Ridge community. The Anderson County population jumped from 26,504 in 1940 to 59,407 in 1950, while Oak Ridge mushroomed to about 75,000 in 1945 before settling down to a postwar level of 30,000. Roane County experienced a smaller increase in population, 13.9%, in the 1940-1950 decade, although in recent years its federally related population has been increasing more than has that of Anderson. (Population trends since 1940 are shown in Table 10.3.) In a broad sense, the presence of the federal installations and the skills and educational requirements necessary for the U.S. Department of Energy (DOE) programs have accelerated the transformation of the character of two counties from rural and agricultural to urban. The influences of the federal enterprise on income, occupations, and educational levels in the two counties are discussed in depth in a University of Tennessee study prepared for the U.S. Atomic Energy Commission.[1]

This influx of people increased the work load on county governments, principally in the fields of legal services, road maintenance, and education. Some idea of the magnitude of the increased use of roads can be obtained from Table 10.4, which shows the number of license plates sold in the county immediately before the establishment of Oak Ridge; at the height of employment, 1944 to 1945; and in 1972. Since road maintenance costs are borne by county shares of the state tax on motor vehicle fuels, they have not been considered as a significant burden in this analysis.

Burdens on the school systems started with the influx of workers who settled in both the rural and urban areas of the counties. High-quality school curricula have been sought by the population for their own families and by the management of the federal complex in the interests of attracting the highly trained specialists necessary for Oak Ridge operations. The city of Oak

10.3 EFFECT OF ORGDP SHUTDOWN

Shutdown of the ORGDP would make it impossible for the government to fulfill its obligations to provide enriched uranium to the nuclear power industry, domestic and/or foreign, and would result in a loss of revenue and a probable crisis in international relations. On the other hand, the environmental costs associated with ORGDP operations (discards and discharges to the environment and the consumption of natural resources) would disappear.

The TVA would have to, temporarily at least, curtail operations at some of its power-generating facilities. This would result in some reductions of gaseous emissions and liquid discards to the environment (an environmental benefit) but would also result in a layoff of employees (a socioeconomic cost).

Furthermore, ORGDP shutdown would incur the following socioeconomic costs.

1. Substantial unemployment and a depressed economy in the areas relying on ORGDP for payroll and purchases.
2. A tremendous burden on the welfare agencies in the same areas.
3. Increased delinquencies in property taxes and a decline in other tax receipts as family purchases are reduced. The decrease in local government revenues when welfare demands increase would create financial difficulties.

The shutdown of ORGDP would create socioeconomic costs of such magnitude that they could not be counterbalanced by the minor environmental benefits achieved.

10.4 TRADE-OFF DISCUSSION

*✓ The major costs associated with the operation of the ORGDP are environmental, whereas the major benefits are socioeconomic. In addition, through the enrichment of uranium, nuclear power is enabled to develop, reducing reliance on fossil fuels for electricity generation and also reducing health hazards associated with fossil fuel use.

*✓ A critical evaluation of impacts found no threat to human life — no significant intrusion of toxic materials into the human food chain — and no evidence of major harm to local wild animals, birds, plants, or aquatic life. On the other hand, the socioeconomic benefits are considerable: the amount of power made available to serve the nation and the rest of the world, the reduction in the U.S. balance-of-trade deficit through income from separative work sales to foreign governments, the potential reduction of crude-oil imports, the environmental benefits from decreased use of coal for power generation, and the economic benefits to the local economic system because of plant payroll and purchases.

After an analysis of the trade-off between costs and benefits associated with ORGDP, the staff concludes that the net benefits of plant operation greatly exceed the costs.

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9. Relationship Between Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity

J. W. Boyle	Environmental Statements Project Energy Division, ORNL

10. Environmental Trade-Off Analysis

R. B. Schappel	Operations Analysis and Planning ORGDP

Appendix A — Geologic Formations of the Oak Ridge, Tennessee, Area

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Appendix B — Environmental Measurement and Monitoring

J. M. Loar	Environmental Impact Program Environmental Sciences Division, ORNL
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ATTACHMENT 5

INTRA-LABORATORY CORRESPONDENCE

OAK RIDGE NATIONAL LABORATORY

June 11, 1982

TO: C. R. Boston

FROM: R. D. Roop R. D. Roop

SUBJECT: Mercury Contamination

The draft Environmental Analysis of the Operation of ORNL (ORNL-5870) identifies mercury contamination as probably the most significant non-radiological water quality degradation resulting from ORNL's operations. In your comments to me on the ORNL-EA, you indicated that this issue is likely to attract attention and that I should be prepared to provide information with which a reader could "put the issue into perspective". This memo provides additional background information on the possible sources of mercury contamination and its significance.

Because I had heard a vague report that mercury contamination was associated with Bldg. 4501, I asked John Boyle about past activities in the building. He confirmed that mercury had been used in the high-bay area of 4501 and referred me to John Drury. Boyle also noted that the building has drainage problems. The high-bay area is equipped with a sump, and during wet periods the pump would remove water from the sump almost continuously.

John Drury indicated that during the 1950's R&D on a lithium-isotope separation process were performed in Bldg. 4501. A small pilot plant, which used "ton quantities" of mercury, was set up in the high-bay area. The process was competing with the one used at Y-12 on a large scale, although the process under development at X-10 did not pan out. (Details of the lithium-isotope separation process are classified; however some of the unsuccessful aspects of the process development research were subsequently declassified.) Drury noted that, because of its density, mercury is difficult to work with. It can cause breakage of glassware, tubing, etc., and it is very difficult to clean up if spilled. Drury indicated that substantial quantities of mercury were undoubtedly spilled. He referred me to Ray Blanco, who was in charge of the project.

Blanco said that the pilot plant operated for approximately six months. In addition, there was associated experimental work which took place in the laboratories surrounding the pilot plant, and Blanco said that quantities of mercuric nitric acid were probably dumped down the lab drains after experiments. He was unable to tell me about the quantities of mercury spilled during pilot plant operation or any procedures attempted for cleanup. Blanco also suggested that we should estimate the mercury emissions from the power plant stack.

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I can see three possible routes for the entry of mercury into the White Oak Creek system. First is the lab drains, second is water pumped from the sump of the high-bay area, and third, mercury may have entered the groundwater and subsequently reached the Fifth Street Branch or White Oak Creek.

The extent of mercury contamination can be summarized as follows: (1) fourteen bluegill collected from White Oak Lake and from White Oak Creek Embayment contained an average level of mercury in muscle approximately 5 times greater than the level in bluegill from the Clinch River (0.66 vs. 0.14 µg/g); (2) the FDA action level for mercury in fish muscle is 1.0 µg/g; (3) one out of 20 fish collected from the Clinch River had a mercury level exceeding the action level, while 2 out of 14 fish from the White Oak Creek system exceeded the level; (4) concentrations of mercury in water of White Oak Creek downstream from ORNL vary from 0.2 to 0.4 µg/L, while concentrations upstream from ORNL are 0.02 µg/L; (5) average concentrations in White Oak Creek exceed the EPA criterion of 0.14 µg/L, but so do the ambient average levels of 0.36 µg/L in the Clinch River at Melton Hill Dam (reason for these levels unknown); and (6) average concentration of mercury passing White Oak Dam is 0.09 µg/L, below the EPA criteria level.

There is no indication of any substantial discharge of mercury in ORNL wastewaters, and the pattern of contamination suggests to me that the current problem is due at least in part to contamination of sediments resulting from past discharges. Unfortunately, there are essentially no data on the concentrations of mercury or most other contaminants in sediments of White Oak Lake.

The principal problem with the mercury is the possible ingestion of contaminated fish by sport fisherman who take fish from the Clinch River in the 3-5 km reach below Melton Hill Dam. The risk is fairly small, since the average levels of mercury in fish in the Clinch are in the "safe" range and the incidence of fish which exceed the action level appears to be small (roughly 5%). However, since sediments and fish do occasionally pass over White Oak Dam, White Oak Creek may be contributing to the problem. This may attract unwanted attention to ORNL.

The question of mercury contamination takes on added relevance because of recent data collected from East Fork Poplar Creek and Bear Creek. During Spring, 1982, a special task force in Environmental Sciences Division sampled mercury in organisms in these creeks, finding quite high levels (up to 30 µg/g). These data suggest that very high levels of mercury are present in fish in the populated areas of Oak Ridge, areas with no restrictions on fishing. The most extensive data on mercury in fish are available in the background aquatic studies for K-25. These data show that, upstream of K-25 but downstream from the confluence of Poplar Creek with East Fork Poplar Creek, the average mercury level for 90 fish was 0.30 µg/g, and 2% of the fish had levels exceeding 1.0 µg/g. Two largemouth bass had levels of 2.14 and 1.67 u/g, and 3 channel catfish had an average level of 0.52 µg/g. These levels were measured some 15-20 stream miles downstream from Y-12, the presumed source of contamination.

Thus, ORNL's mercury problem is almost trivial compared to other problems on the DOE reservation. Nonetheless, it represents a situation which undoubtedly merits further investigation so that a more complete assessment of risk can be made.

RDR/swp

CC: J. W. Boyle
H. E. Zittel

bcc: Gough

ATTACHMENT 6

CONFIDENTIAL

OFFICE MEMORANDUM

TO: W. Van Winkle

DATE: 14 April 1982

FROM: S. B. Gough

SUBJECT: Status report--U.S.G.S. joint study with me re mercury, et al. in E. Fork Poplar Cr.

Persuant to Auerbach's call to the U.S.G.S. on 12 April regarding the sensitive data collected on Poplar Creek, my brother, Dr. Larry Gough, has turned over the original field notes, his lab report and any other pertinent information to his branch chief for shipment to Dr. Auerbach. Because of this wrinkle in this study, it is not likely that any data will be publicly released (i.e., in open file format); however, the U.S.G.S. personnel have made it clear that they will not perjure themselves if, for example, a request is made under the Freedom of Information Act. I view this latter possible avenue of receipt of the data as rather unlikely, however.

Before Dr. Auerbach imposed the freeze on data collection, Arsenic values were obtained. For your information, they follow the same declining (but elevated) pattern as mercury, although the values are not as excessive as mercury. For example, the (3) sites on Poplar Cr. were: 12 mg/l (min.; was to be redone--may be as high as 15), 4 mg/l, and 1.5 mg/l. For this metal in plant tissue their level of detection is currently 0.05 mg/l. I personally have not looked at the literature to have a good feel for the findings.

23 June 1983

NOTE: The wrong units were inadvertently used in the discussion above. The term "mg/l" should read "ppm" or "μg/g."

SBG

ATTACHMENT 7

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE CORPORATION
NUCLEAR DIVISION

POST OFFICE BOX X
OAK RIDGE, TENNESSEE 37830

26 March 1982

Dr. Harry A. Tourtelot
Chief, Branch of Regional
Geochemistry
U.S. Geological Survey
Denver Federal Center
Denver, CO 80225

Dear Dr. Tourtelot:

This is to request that you or Dr. Larry Gough send me the official report, and any subsequent addenda, on trace element levels in plant tissue samples collected in the East Fork, Poplar Creek, Oak Ridge, TN in December, 1981 by Dr. Gough and myself. This material will expedite and augment the preparation of a proposal to study metals in Poplar Creek in more detail.

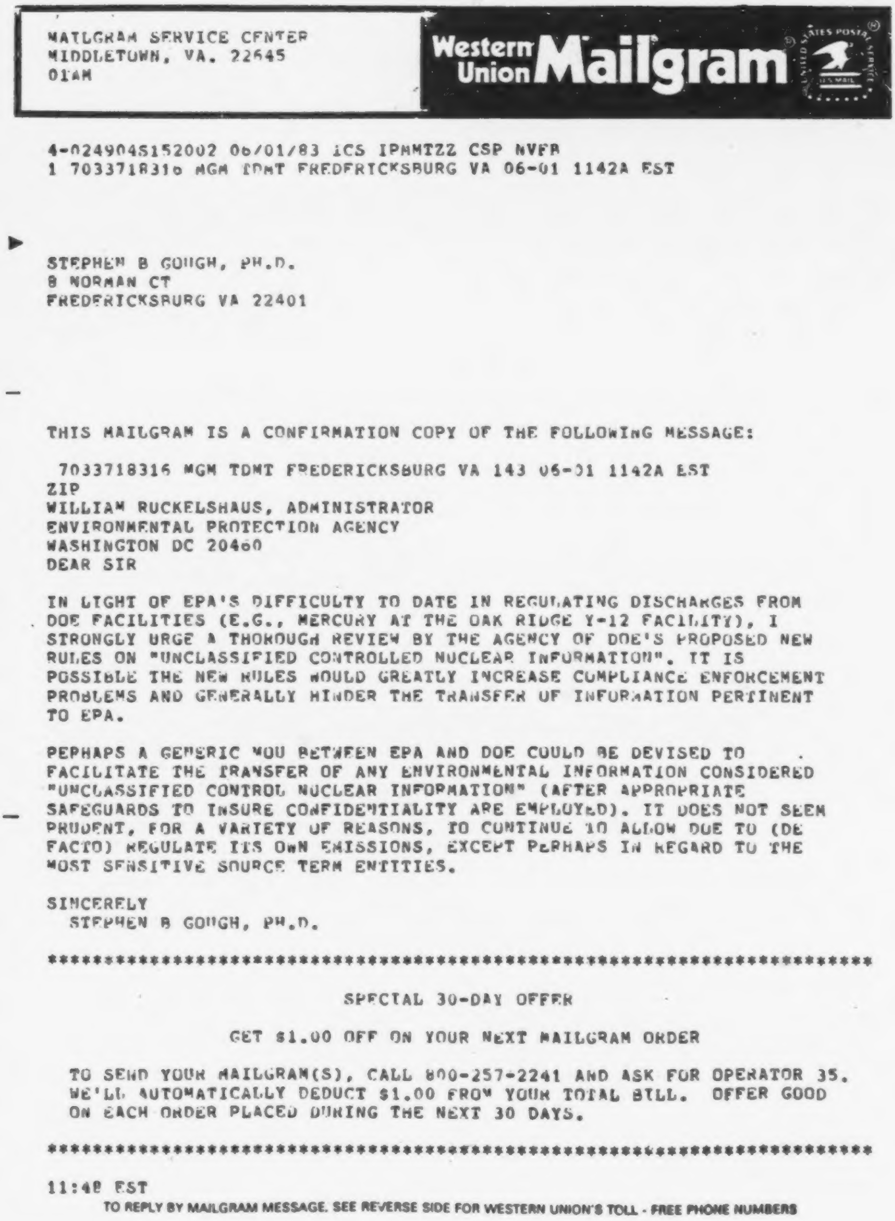
Thank you in advance for the report. Thanks also for the great help given during collection and in sample analysis and interpretation.

Sincerely,

Stephen B. Gough, Ph.D.
Research Associate
Environmental Sciences Division
Aquatic Ecology Section

SUPERVISOR'S APPROVAL__________________________
W. Van Winkle, Head
Aquatic Ecology Section

ATTACHMENT 8



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1 7033718316 MGM TDMT FREDERICKSBURG VA 06-01 1142A EST

STEPHEN B GOUGH, PH.D.
8 NORMAN CT
FREDERICKSBURG VA 22401

THIS MAILGRAM IS A CONFIRMATION COPY OF THE FOLLOWING MESSAGE:

7033718316 MGM TDMT FREDERICKSBURG VA 143 06-01 1142A EST
ZIP
WILLIAM RUCKELSHAUS, ADMINISTRATOR
ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON DC 20460
DEAR SIR

IN LIGHT OF EPA'S DIFFICULTY TO DATE IN REGULATING DISCHARGES FROM DOE FACILITIES (E.G., MERCURY AT THE OAK RIDGE Y-12 FACILITY), I STRONGLY URGE A THOROUGH REVIEW BY THE AGENCY OF DOE'S PROPOSED NEW RULES ON "UNCLASSIFIED CONTROLLED NUCLEAR INFORMATION". IT IS POSSIBLE THE NEW RULES WOULD GREATLY INCREASE COMPLIANCE ENFORCEMENT PROBLEMS AND GENERALLY HINDER THE TRANSFER OF INFORMATION PERTINENT TO EPA.

PERHAPS A GENERIC MOU BETWEEN EPA AND DOE COULD BE DEVISED TO FACILITATE THE TRANSFER OF ANY ENVIRONMENTAL INFORMATION CONSIDERED "UNCLASSIFIED CONTROL NUCLEAR INFORMATION" (AFTER APPROPRIATE SAFEGUARDS TO INSURE CONFIDENTIALITY ARE EMPLOYED). IT DOES NOT SEEM PRUDENT, FOR A VARIETY OF REASONS, TO CONTINUE TO ALLOW DOE TO (DE FACTO) REGULATE ITS OWN EMISSIONS, EXCEPT PERHAPS IN REGARD TO THE MOST SENSITIVE SOURCE TERM ENTITIES.

SINCERELY
STEPHEN B GOUGH, PH.D.

****

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Mr. Gore. Thank you very much.

We would like to hear now from James Fuzzell, chairperson of the Client Council.

We are delighted to have you here. Please proceed.

STATEMENT OF JAMES FUZZELL, CHAIRPERSON, CLIENT COUNCIL

Mr. Fuzzell. Thank you very much.

My name is Jimmy Fuzzell. I am chairperson of the Oak Ridge Area Client Council. I am here today to give testimony on the impact of mercury releases at the Oak Ridge Complex.

Historically, my parents, along with other blacks, migrated to Oak Ridge, Tenn., seeking work in the early 1940's. My parents found traditional work. My father was in maintenance at the X-10 plant, and mom performed domestic work in private homes, until they passed away in February 1979 and March 1981, respectively.

My father, after retirement, died of cancer of the larynx. And my mother suffered numerous disorders with similar symptoms described in mercury poisoning. She finally received disability shortly before death for what doctors described as diabetes and a nervous disorder. As far back as I remember, both my father and mother caught and ate game out of the streams and rivers affected by mercury contamination.

For approximately 28 years, I personally have fished, caught and eaten game at East Fork Poplar Creek and played in and around the waters along with my brothers and sisters and with other low income, black Scarboro residents. Our children, due to a pressed financial condition, have also at one time or another ate or played from the creek unaware of mercury contamination until recently, because the creek was not posted. One of my family's favorite delicacies was that of turtle meat and blue gill.

Regardless of what others may contend or testify to, Oak Ridge residents who could financially afford to purchase select seafood, eat out regularly, and their children have never been exposed or subjected to playing in unsafe waters.

Scarboro, a predominantly black community of 1,500 to 2,500 homeowners, disabled and poor families, apparently has been and are continuing to be viewed by DOE, Union Carbide, and other citizens as simply a dump site. Not very long ago, that community was used as the main dumping area for the city to discard its garbage and other germ-carrying diseases. We thus are a severely unprotected, defenseless, oppressed community. Through insensitivity, no one has elected to address the community's health concerns, and mercury dumping continues to threaten this and surrounding communities.

East Fork Poplar Creek itself flows directly from the Y-12 plant through Scarboro into Roane, Anderson, and West Knox Counties. In these places, subdivisions, upper income, section 8 apartments and country clubs have been erected.

The myth that we are not concerned is absolutely false. Some of our children do not own decent shoes, and the few signs posted recently of contaminated waters in our community are vague, deficient, poorly erected, and are not visible. Our black preschool children and many elderly and disabled blacks and whites are uneducated and support services are deficient.

Many cannot understand the potential danger imposed on the communities threatening human life. For this reason, we cannot and shall not accept DOE's assessment that our community is less contaminated than other areas of Oak Ridge, while at the same time 2 ounces of mercury a day by DOE's own calculations are still being admitted from New Hope Pond into East Fork Poplar Creek every day. While Assistant DOE Counsel Jim Foutch and other officials are working with the State to comply with water quality control laws, they have shown absolutely no desire to erect health facilities in the affected communities.

We consider it criminal for DOE officials to misinform the Scarboro community residents that the community has not been endangered when, in fact, studies at East Fork Poplar Creek show turtles at Scarboro have mercury results averaging from 0.56 to 0.46 parts per million mercury. Scarboro community soil from along East Fork Poplar Creek ranges from 0.5 to 0.85 parts per million mercury. East Fork Poplar Creek water ranges about or below 0.5 parts per billion mercury.

While assistant DOE official, Mr. Foutch, admitted that they have not always been good neighbors, we find no credibility in his conclusions that DOE will now strive to be the good neighbor that they ought to be and do not agree with him when he states that it has not always been that way in the city of Oak Ridge.

Scarboro has always been an isolated community, not of its own choice. The effects of racism has had a profound impact on its growth, education and access to the entire community.

I, the chairperson of the Oak Ridge Area Client Council, a grassroots community organization, comprised of poor and working poor, speak on behalf of the membership regarding the chemical toxic dumping issue. We want to know why fish are dying in the creeks, why DOE officials propose to look the other way while human life and the environment remains endangered by mercury and other chemical poisoning at Poplar Creek, why present posting is inadequate, why on God's green Earth, Scarboro specifically, during recent community meetings, was misinformed and told by DOE officials that the community had not been endangered when none of the residents have not been tested?

We foresee that while the Nation is apparently unconcerned for its lower income residents, the country must not only be competing with other countries in armed warfare but as a priority be concerned with the suckling of its own and setting an example to the entire world regarding human life and environmental problems and issues affecting all of us.

Scarboro is a predominantly black community, one that has already undergone the disparities of not having a profound voice in city government in problems that have severely affected not only our community but the surrounding communities. We have only one black seated on the city council.

The mercury contamination problem as yet has not been truly assessed by DOE officials. The memorandum of understanding written by DOE officials is useless and of no consequence. It fails to address the health concerns of the community, and the timetable mentioned for working on the issue is indicative of long-term resolution with no guarantee to those who have already become alarmed by the coverup itself.

Until DOE officials are forced to strictly comply with EPA regulations and laws, the future survival of the community is questionable. Residents lack support services and cannot afford proper medical treatment. The low income are already socioeconomically deprived; many are unemployed or underemployed; many express concerns for their jobs when asked to speak out on the mercury dumping issue.

Employees of Y-12 have become alarmed, as well, saying that they have only been tested for uranium. We have talked to people, not only in Scarboro, but those in Roane and Anderson Counties, people from all segments of the community, and thus we realize the myth that there is little or no concern is invalid.

As a grassroots community organization working on the issues of concern to our poor and working poor people, we express their thoughts and ask for the appropriate remedies. We propose that DOE clean up the mess that has been covered up for so long. We have met with environmentalists who have indicated that a stirring of creek sediment could or would create further hazards for the community. If so, we ask that every precautionary measure be taken to protect the citizens to prevent future health hazards.

We want the Federal Government to oversee that in this instance that communities are evacuated if the need arises. We want on-site health screening for all at DOE's expense, which includes hospitalization, if necessary. Such tests should be implemented by independent medical facilities to insure that no other coverup will occur.

Since medical tests vary, the community should be educated on these matters. We want assurance from DOE officials that our airways, streams, and game will no longer be subject to contamination. We, too, are very much concerned for our families and children.

In conclusion, based on DOE's findings and conclusions, we want a complete report and action taken to prevent health and environmental problems that are affecting us.

Thank you very much for this opportunity.

Mr. GORE. Thank you very much.

We are glad to welcome Mr. Terry Weaver to the panel. Mr. Weaver is president of the Oak Ridge Chapter of the NAACP. We would like to hear your statement, Mr. Weaver.

Mr. WEAVER. Thank you very much.

First, I would like to ask the question, if there are any Washington bureaucrats out there that smoke, we hope that you will refrain from smoking until you leave the Oak Ridge area. We are trying to clear up our pollution problem here. [Laughter.]

Mr. GORE. Mr. Weaver, if you will hold off 1 second. We have had a practice of swearing all witnesses, and I forgot when you joined the panel. If you would stand and raise your right hand, please.

[Witness sworn.]

Mr. GORE. Please be seated and give your statement, Mr. Weaver.

STATEMENT OF TERRY WEAVER, PRESIDENT, OAK RIDGE BRANCH, NATIONAL ASSOCIATION FOR THE ADVANCEMENT OF COLORED PEOPLE

Mr. **Weaver**. I would like to express a sincere thanks to Congresswoman Marilyn Lloyd and Congressman Albert Gore for providing the Oak Ridge community with an opportunity to voice our concerns about the mercury spill and other pollutants in the Oak Ridge area. I will share with you some of the comments of some of our people in the written statement that I am sure you have a copy of right now.

Let me first start off by saying that man can survive as a species without cleaning up the environment, but the quality and length of our lives will suffer. The Oak Ridge community is concerned about the environment and want to take whatever steps necessary to keep it clean. Much of the material spoken and written about the mercury spill and other environmental pollutants has been presented with great emotion from a position firmly on one side or the other of the issues.

The media and some scientists have dramatized statements with respect to the immediate seriousness of the pollution problems. These frightening pronouncements are pounced on by the mass media and widely dissimilated for the public. Predictably, public emotion has risen.

I am convinced that the pollution problem is huge and very serious. I believe that the community shares this conviction. Our concern about it is profound. Many of us believe or act as if we can enjoy a clean environment while someone else pays the bills. The cost of realizing even a moderate improvement in the pollution problem will be in the millions or perhaps billions of dollars, and must be done by all of us.

However, there is no sense of panic because of this community's unique confidence that this problem has a technological solution. However, this does not relieve our concern. More are needed than technological answers and money.

Constructive measures applied through information and technology are the main basis of hope in meeting this environmental problem. Such a program combines innovative and interdisciplinary approaches. All areas of scholarship and learned endeavor in science, the humanities, and the social sciences must be involved. This deals with the problem, but not why and how it happened.

This environmental crisis was caused by people—people in industry and Government. The question becomes, what can be done to prevent similar crises? This environmental crisis deals with people. Since the current crisis was caused by people—in kind, is implied when helpful dialog, pragmatic solutions, are sought. Thus, implementation of corrective proposals should require the support of all segments of the Oak Ridge community and government.

The impact of mercury releases at the Oak Ridge Complex upon citizens may be more psychological than physical. There is a realization that our technology poses a threat to health and safety of the citizens if not properly managed. People are asking how this could happen, and why. Will it happen again?

There is a perception of betrayal. Why wasn't the public informed? What is still being kept from the public?

There is a great amount of public uncertainty about the environmental conditions in the Oak Ridge area. There is increasing concern about the possible long-term pollution exposure to the environment from past and present DOE-ORO accidents which have not been revealed. The uncertainty and concern can only be relieved if the public is informed by industry and government on what environmental hazards are posed by DOE-ORO and how those hazards are being dealt with.

The most serious problem is public distrust. This distrust is especially acute among the residents of the Scarboro community which is closest to the Y-12 plant. DOE-ORO has a history of not acting in the long-range best interests of black residents of the Scarboro community. Governmental planning in relation to the black community has been expedient and short-sighted.

Many Scarboro residents are again wondering if DOE-ORO officials did not and continue to not act in the best interest of the community. Has industry and government replaced appropriate concern for the long-range health, safety, and well-being of the community with expediency and short-sightedness? It is hoped that these uncertainties and concerns will be answered. Let us hope the answers meet the concerns and dispel the uncertainties.

An overview of policy at high Government levels, given impetus by informed citizenry, could promote the legislation that could result not only in an early cure of the damage already effected but, more importantly, in the prevention of future alterations in the Oak Ridge area. The time is late, but not too late. How much we care about our environment in Oak Ridge, and the persistence with which we try to achieve its protection, will determine if we, ourselves, replenish our environment by technology and education.

This testimony is given in response to an invitation received July 7, 1983, to testify at a joint hearing of the Subcommittee on Energy Research and Production, and the Subcommittee on Investigations and Oversight. This presentation is based on a Scarboro community meeting in June 1983 called by Oak Ridge City Councilman E. H. Upton, which was attended by DOE officials and concerned citizens. Comments by Scarboro Neighborhood Improvement Association were also used. These comments are attached.

[The prepared statement of Mr. Weaver and attachments follow:]

PRESENTATION TO JOINT HEARING BEFORE SUBCOMMITTEE ON ENERGY RESEARCH AND PRODUCTION AND SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT ON

"THE IMPACT OF MERCURY RELEASES AT THE OAK RIDGE COMPLEX"

NATIONAL ASSOCIATION FOR ADVANCEMENT OF COLORED PEOPLE
(NAACP) Oak Ridge, Branch

Terry Weaver, President
July 11, 1983

NATIONAL ASSOCIATION FOR THE ADVANCEMENT OF COLORED PEOPLE
Oak Ridge Branch • P.O. Box 805 • Oak Ridge, Tennessee 37830 • (615) 483-8155

Man can survive as a species without cleaning up the environment, but the quality and length of our lives will suffer. The Oak Ridge community is concerned about the environment and want to take whatever steps necessary to keep it clean. Much of the material spoken and written about the mercury spill and other environmental pollutants has been presented with great emotion from a position firmly on one side or the other of the issues. The media and some scientist have dramatized and probably made exaggerated statements with respect to the immediate seriousness of the pollution problems. These frightening pronouncements are pounced on by the mass media and widely dissimilated for the public. Predictably, public emotion has risen.

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This environmental crisis was caused by people. People in industry and government. The question becomes what can be done to prevent similar crises. This environmental crisis deals with people. Since the current crisis was caused by people, a reciprocity in kind is implied when helpful dialogue, pragmatic solutions are sought. Thus, implementation of corrective proposals should require the support of all segments of the Oak Ridge community and government.

The impact of mercury releases at the Oak Ridge complex upon citizens, may be more psychological than physical.

1) There is a realization that our technology poses a threat to health and safety of the citizens if not properly managed. People are asking how this could happen and why? Will it happen again?

2) There is a perception of betrayal. Why wasn't the public informed? What is still being kept from the public?

There is a great amount of public uncertainty about the environmental conditions in the Oak Ridge area. There is increasing concern about possible long term pollution exposure to the environment from past and present DOE-ORO accidents which have not been revealed. The uncertainty and concern can only be relieved if the public is informed by industry and government what environmental hazards are posed by DOE-ORO and how those hazards are being dealt with.

The more serious problem is public distrust. This distrust is especially acute among the residents of the Scarboro Community which is closest to the Y-12 Plant. DOE-ORO has a history of not acting in the long-range best interests of the black residents of the Scarboro Community. Governmental planning in relation to the black community has been expedient and short-sighted.

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An overview of policy at high government levels, given impetus by informed citizenry could promote the legislation that could result not only in an early cure of the damage already effected but more importantly in the prevention of future alterations in the Oak Ridge area. The time is late but not too late. How much we care about our environment in Oak Ridge, and the persistence with which we try to achieve its protection will determine if we ourselves replenish our environment by technology and education.

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TW:db

Attachment

/ SCARBORO NEIGHBORHOOD
IMPROVEMENT ASSOCIATION,ir
OAK RIDGE, TN 37830

A. Chambles, President
200 S. Benedict Ave.
483-8922

W. Anthony, V. President
219 S. Benedict Ave.
483-7008

M. Guinn, Secretary
186 S. Benedict Ave.
483-1985

L. C. Manley, Jr., Treasurer
190 S. Benedict Ave.
482-1577

Board of Directors:
A. Chambles
W. Anthony
M. Guinn
L. C. Manley, Jr.
T. Weaver 483-8155
W. Threat 483-4205
H. Land 483-3849

June 30, 1983

Mr. James D. Harless
City of Oak Ridge
P. O. Box 1
Oak Ridge, TN 37830

Dear Mr. Harless:

Thank you for providing and preparing the Certificates of Appreciation from EQAB. The certificates were presented at our June 25 meeting of the Scarboro Neighborhood Improvement Association, Inc. Mrs. Helen Land and Mr. George Reed were very appreciative of the certificates and felt much pride in being recognized by the City of Oak Ridge. I am still unsure about the publicity that they desire, but I suppose that the mentioning of their names and community contributions in the local paper would be appropriate.

I have enclosed additional environmental information on the following topics:

I. Residents' suggestions on the placement of mercury pollution signs,
II. Concerns about mercury and other potential environmental toxins locally,
III. List of residents requesting soil analysis, and
IV. Illegal dumping.

We appreciate your active interest in our environment, and we hope that a rational, appropriate, and rapid solution will be found for the widely publicized mercury pollution that has plagued our city.

Sincerely,

Al Chambles

Al Chambles, President
SNIA, Inc.

cc: E. H. Upton
C. C. Coutant

I. Suggestions on Placement of Mercury Pollution Signs on East Fork Poplar Creek

Several suggestions were made by members attending the Saturday, June 25 meeting of SNIA on the best placement of mercury pollution signs along the portion of East Fork Poplar Creek near the Scarboro Neighborhood.

1. All areas where people can easily enter the creek:
    - (a) Intersection of East Fork Poplar Creek, Tulsa Road, Wilberforce Avenue.
    - (b) On East Fork Poplar Creek in back of K-Mart.
    - (c) Intersection of East Fork Poplar Creek and Tuskegee Avenue.
    - (d) Intersection of East Fork Poplar Creek, Tulsa Road, and Burnan Woods entrance (several kids have been known to wade in the creek at that point).
2. It was reported that kids have been known to walk, wade, and play in the creek throughout its length, starting close to the outlet of New Hope Pond and ending near the Scarboro Neighborhood. In view of this, some suggested that a sign should be placed approximately every 100 yards next to the creek throughout its length. However, it is not known whether it is at all possible to create a warning sign that would capture the attention of playful kids.

II. Other Pollution Concerns

The continuing publicity about the mercury pollution has created a high level of apprehension among some residents in the Scarboro Neighborhood. The concerns expressed at the Saturday SNIA meeting are listed below:

1. Since Scarboro is in very close proximity to the Y-12 Plant, air monitoring, and soil and vegetable sampling for a wide range of potential toxic pollutants should be conducted on a continuing basis (no one at the meeting knew of an air monitor in the Scarboro Neighborhood).
2. Some expressed fear of eating vegetables grown in Scarboro.

III. Soil Analysis Requests

Two residents asked SNIA to inform the City of their desires to have their garden soil analyzed for mercury and other potentially toxic pollutants:

Mrs. Jessie Bowens
210 S. Dillard Ave.
Oak Ridge, Tennessee
482-3642

Mr. George Reed
Bettis Lane
Oak Ridge, Tennessee

IV. Illegal Dumping

Dumping of old furniture and other items has commenced again at the end of Wilberforce Avenue near the former Scarboro School and the area near the intersection of Tulsa Road and Wilberforce Avenue.

Mr. **Gore**. Thank you very much for an excellent statement. We appreciate it.

Our final witness on this panel is Dean Rivkin, board member of the Legal Environmental Assistance Foundation at the University of Tennessee College of Law.

Welcome, Mr. Rivkin, and please proceed.

STATEMENT OF DEAN HILL RIVKIN, BOARD MEMBER, LEGAL ENVIRONMENTAL ASSISTANCE FOUNDATION, UNIVERSITY OF TENNESSEE COLLEGE OF LAW

Mr. **Rivkin**. Thank you.

My name is Dean Hill Rivkin, and I am professor of law at the University of Tennessee, where I specialize in environmental and public law matters. I appear today as a board member of the Legal Environmental Assistance Foundation, which, for your information, Mr. Gore, is a private regional public interest law firm devoted to the protection of the environment and public health.

One of LEAF's primary objectives is insuring accountability of government agencies on matters affecting the environment and public health. Parenthetically, I should mention that since 1976 I have represented a coalition of citizens, health and environmental organizations in litigation with the Tennessee Valley Authority over their sulfur dioxide emissions.

The analog between that episode involving a Federal facility and Federal environmental laws, and this episode, are quite striking. And I thought I might initially state them because the pattern here is very similar to the pattern there.

Initially, there was a task force set up in the TVA-EPA air pollution situation, the task force deadlocked as I believe we have had here over the past years. The mission orientation of the agency there, the Federal agency, overrode all other legitimate concerns respecting the environment. TVA's mission orientation related to its low rates; DOE's we have heard today relates to national security and the like.

In the TVA situation, individual styles seemed to control, that individual style overrode the mandates of law. We are hearing here today that individual style is going to take care of the situation. I do not believe that it will.

In the TVA situation, citizens using provisions that Congress wisely included in Federal environmental laws, citizen supervision, were forced to file citizen suits to break what was perceived to be the deadlock on an issue. The Legal Environmental Assistance Foundation on June 11 of this year served notice, under law, that it will file citizen suits within the 60-day—or following the 60-day—period—over the substantial range of environmental problems that this committee has heard today.

Finally, as in the TVA situation, Congress had to come in, make changes to laws, make changes to institutional arrangements to correct the situation. For us, the chief issue here today is whether DOE has fulfilled its environmental obligations under applicable law. I believe the testimony today, as documents before your committee show, that DOE has been derelict in its responsibilities in meeting a number of Federal environmental statutes; those relating to mercury as well as other hazardous and toxic pollutants.

In a way, the mercury problem is like the proverbial canary in the coal mine. The fact that it emerged and has come out now has opened up a whole range of other possible problems, and we are very, very thankful that it has come out.

We believe that the problem, as you suggested at the beginning of this hearing, are institutional and systemic and the solution to the problem must incorporate this reality. There are a number of lessons that I think can be learned from reading the record in this hearing and looking at this problem. I want to take five of them very briefly and support them also very briefly.

One, DOE, institutionally, we believe cannot be trusted to regulate its own environmental affairs. I use institutionally to distinguish it from individual culpability which we are not in a position to assign. I also use the word "trusted" because in response to Mrs. Lloyd's concern earlier in the hearing, we believe, and I believe, Congress has been very plain on this question, that Federal facilities should be in the lead of environmental compliance.

That is, Federal facilities that must comply with all applicable environmental laws under the Executive order—the relevant Executive order, and that if Federal facilities do not comply—we have Dr. Bruner, for example, having to face numerous private industries in this State with similar problems—and I am experienced in representing individuals and organizations in these type proceedings—the first thing they will say is what are you doing over at DOE; why are they having a substantial kind of problem? I believe it is a matter of trust, and I believe it is a matter of public trust that we are talking about.

Two, DOE, institutionally, cannot be trusted to approach environmental concerns with full scientific objectivity.

Three, DOE, institutionally, cannot be trusted to obey the full letter and spirit of all applicable environmental laws.

Four, DOE, institutionally, cannot be trusted to deal openly with State and Federal regulatory bodies.

Five, and finally, DOE, institutionally, cannot be trusted to provide full and impartial information to the public on matters of serious environmental and health concerns.

Thus far today, the committee has heard numerous examples—and I could list them, but I believe it would be repetitive—of situations where DOE had either failed to disclose information or, in fact—and we do not know this as Mr. La Grone said—has deceived the public.

I want to supply one more example to this committee, and I believe it is a very important example. As you will recall, there was a synthetic fuel facility planned by the Koppers Corp. here in Oak Ridge. Koppers was seeking funding for this facility from the U.S. Synthetic Fuels Corporation.

The Department of Energy was required to do a draft environmental impact statement, which was published in August 1982; the title of it is "Sale of Segment 0 of the Oak Ridge Reservation to the City of Oak Ridge, Tennessee."

I scoured this environmental impact statement because there was, during the course of these proceedings, the consideration of this plan; there was concern that there would be dredging in the Clinch River. And citizens, in the course of this proceeding, expressed deep concern that the sediment contained radioactive waste. They did not know there was mercury in this waste. DOE knew there was mercury in this waste.

There is mention of mercury in this report. I do not want to say that the word was not mentioned. There is no analysis of mercury sediment in the draft environmental statement for the synthetic fuel plant, which I think for the time being is not going to be built. To me, this is a perfect example of how failure to disclose information in one small narrow setting spills into other situations where deceptions build upon deceptions. Once you do not reveal, then you have got to hold this back in other situations.

This is a primary example to me, and I would like to include the relevant sections of this report, which is published, into the record of this hearing, if I may.

Mr. GORE. Without objection, we will receive that for consideration.

[The information follows:]

DOE/EIS-0094D

DRAFT
Environmental Impact Statement

Sale of Segment O of the Oak Ridge Reservation to the City of Oak Ridge, Tennessee

(Proposed Site for Tennessee Synfuels Associates Coal-to-Gasoline Facility)

August 1982

U. S. Department of Energy

Cover Sheet

DRAFT ENVIRONMENTAL IMPACT STATEMENT

SALE OF SEGMENT O OF THE OAK RIDGE RESERVATION
TO THE CITY OF OAK RIDGE, TENNESSEE
(PROPOSED SITE FOR TENNESSEE SYNFUELS ASSOCIATES COAL-TO-GASOLINE FACILITY)

(a) Lead Agency: U.S. Department of Energy. Cooperating Agencies: U.S. Coast Guard, U.S. Army Corps of Engineers, Tennessee Valley Authority, U.S. Environmental Protection Agency, and the State of Tennessee.

(b) Proposed Action: Sale of approximately 492 hectares (1217 acres) of Segment O of the Oak Ridge Reservation to the City of Oak Ridge, and the subsequent granting of related easements, for the purpose of industrial development to aid the City in achieving economic self-sufficiency pursuant to the Atomic Energy Community Act of 1955.

(c) For Further Information Contact: (1) Mr. J. F. Wing, Chief, Environmental Protection Branch, Oak Ridge Operations, Department of Energy, P.O. Box E, Oak Ridge, TN 37830, Ph: 615-576-0845; (2) Dr. Robert J. Stern, Director, Office of Environmental Compliance, Office of the Assistant Secretary for Environmental Protection, Safety, and Emergency Preparedness, Room 4G-064, Forrestal Building, 1000 Independence Avenue SW, Washington, D.C. 20585, Ph: 202-252-4600; (3) Mr. Henry Garson, Esq., Assistant General Counsel for Environment, Room 6D-033, Forrestal Building, Washington, D.C. 20585, Ph: 202-252-6947.

For Copies of the DEIS Contact: Mr. J. F. Wing at the address above.

(d) Designation: DRAFT EIS

(e) Abstract: The statement assesses the environmental impacts associated with the sale of approximately 492 hectares (1217 acres) of Segment O of the Oak Ridge Reservation to the City of Oak Ridge, TN for industrial development to aid the City in achieving economic self-sufficiency as required by the Atomic Energy Community Act of 1955. Related easements also would be granted as a result of the action, including an easement across the Oak Ridge Gaseous Diffusion Plant to permit rail access to the site. Segment O is located at the southwest end of the Reservation, across the Clinch River from the Oak Ridge Gaseous Diffusion Plant. The City of Oak Ridge has expressed its intent to sell the site to Tennessee Synfuels Associates (TSA) which plans to construct a plant for the production of 50,000 bpd of liquid fuels (primarily gasoline) from coal using gasification, methanol synthesis, and synthesis of gasoline from methanol. Because the construction and operation of the proposed Tennessee Synfuels Associates plant is the foreseeable consequence of the proposed action, this EIS addresses the impacts which would be associated with that plant.

Impacts associated with the proposed TSA plant were assessed in terms of air quality, solid waste disposal, water quality, noise, terrestrial and aquatic ecology, public and occupational health, socioeconomic conditions, historic resources, aesthetics, transportation, effects of potential accidents, and impacts upon existing DOE facilities in the Oak Ridge area. The proposed facility would have a significant beneficial economic impact by increasing employment in the area and through taxes paid to Roane County and the City of Oak Ridge. Potentially significant adverse impacts which have been identified include: odors from hydrogen sulfide in the area near the plant; permanent use of the site for the disposal of waste from the plant; possible risk to groundwater should materials containment fail; noise from the flare during emergencies, upsets, and startup; removal of onsite habitat for plant and animal species; population increases, employment and population fluctuation, and increased demand in a tight housing market; aesthetic degradation due to plant visibility and to illumination and noise from the flare; blockage of Blair Road and noise due to rail transport; traffic increases on TN 58 to over twice capacity during construction of the TSA plant, with resulting congestion, delays and service degradation; and increased risk of fatalities, injuries, and property damage resulting from product transportation accidents.

Many measures have been identified, which, if implemented, would mitigate the impacts of the proposed facility by reducing either the severity of the effect or the probability of the adverse event. Where TSA has committed to the implementation of a mitigation measure, the mitgative effect has been assumed and the remaining impact assessed. Possible measures proposed by TSA and others to mitigate the impacts identified above include: for odor control, implementation of then-available BACT in the design of each module and monitoring for odorous compounds; for groundwater protection, implementation of a spill prevention control and countermeasure plan and excavation/replacement of unsuitable rock or use of drilled piers under materials storage facilities; for flare noise, use of ground-level incinerators; for habitat loss, establishment of alternative habitat onsite or on other land controlled by TSA partners; for adverse effects related to employment, population and traffic, coordination with other projects and employers in the area to reduce peaks; for aesthetics, construction of a berm on the southwest border of the site and use of ground-level incinerators; for Blair Road delays, elimination of the grade level crossings; for noise in Blair spur, scheduling trains to avoid sleeping hours; for transportation accidents, shipping products by rail or pipeline.

DOE's only reasonable alternative to the proposed action would be not to sell the land to the City of Oak Ridge. DOE would have no role in decisions by TSA, a private party, with respect to alternative products or alternative technologies. TSA has selected and committed to the proposed site and has indicated that, failing acquisition of the site, it would abandon plans for the plant. Impacts of the no action alternative would be the continuation of existing conditions and trends.

(f) Comments on this DRAFT EIS should be addressed to Mr. J. F. Wing at the address given above. To be considered in the preparation of the Final EIS, comments should be submitted by September 20, 1982.

systems. A soil landfill liner and leachate collection system would be used in an effort to contain and control leachate. After onsite landfill capacity would be exhausted (30 module years), solid waste would be disposed offsite. TSA is evaluating potential disposal areas within 20 km of the plant site.

Groundwater quality would be significantly degraded if spills, leaks, or loss of containment were to occur and allow contamination of the underlying aquifers. The groundwater would become less suitable for use for an indefinite period of several decades or more.

mercury?

Dredging would be associated with the need to remove about 5,000 cubic yards of sediment to construct four facilities in the Clinch River. Minor amounts of silt and clay with their associated contaminants would be transported to the Tennessee River. The resuspension of radionuclides in the sediments would not threaten human health as shown in Section 4.2.3.10. The additional sedimentation which would occur from upland construction activities and increases in suspended solids in surface waters following heavy rains would not be significant.

The facility would discharge an average of 0.64 m^3/s (22.9 cfs) of treated wastewater. This wastewater would be warmer than the Clinch River waters and would contain higher concentrations of dissolved solids, plant nutrients, oxygen-demanding materials, and some toxic substances. The largest impacts would be found on the south side of Brashear Island where the wastewater initially would be mixed with the river water. Parameters for which the level would increase include ammonia-nitrogen, cyanide, thiocyanate, zinc, biochemical oxygen demand, dissolved solids, nutrients, and temperature. Of these, the increase in concentrations of ammonia, cyanide, and biochemical oxygen demand would be the most significant, but none would result in significant adverse impacts on water quality. Table 4-9 presents the expected changes in water quality due to the proposed facility.

S.4.3 Noise

Noise from activities associated with operation, construction, and transportation could exceed the criterion level (50 dBA), which TSA has committed not to exceed at residential property lines during normal facility and aquatic species would not be affected. Impacts to wildlife would be mitigated through a plan generated under the auspices of the Fish and Wildlife Coordination Act (see Appendix E).

S.4.5 Health and Safety

TSA has proposed an occupational health and safety program which would include medical surveillance, industrial hygiene, toxicology and hazard evaluation, and engineering controls and special work practices. With implementation of these measures, the TSA program would be consistent with advanced state-of-the-art industrial health practices, and would reduce significantly the potential for adverse health effects on the workforce (see Section 4.5).

No adverse public health effects from construction and normal operations were identified as shown in Section 4.6. However, air and water quality monitoring has been planned by TSA to identify changes in environmental quality that could affect public health and welfare. Special environmental monitoring programs and risk assessments would evaluate potential public health impacts from pollutants that have not been identified or evaluated previous to operation.

S.4.6 Socioeconomic Conditions

Major socioeconomic impacts resulting from the construction and operation of the proposed project would include area population increases, increased demand in a tight housing market, increased employment opportunities and income, and increased tax revenues (see Section 4.7). As a result of the proposed project, it is estimated that 3568 persons would in-migrate to the area by 1994 and 1386 persons would have been permanently added to the area population by 1996. The majority of in-migrating population would reside in Anderson, Knox, and Roane Counties as shown in Table 4-16. Among the communities, the City of Oak Ridge is expected to absorb the largest permanent in migrating population. Large fluctuations in the work force over the life of the project (see Figure 4-6) could cause some disruption to area communities.

APPENDICES

Page

A. COMMENTS ON THE DEIS AND REPLIES A-1

B. PROPOSED INSTRUMENT OF SALE AND RELATED ITEMS. B-1

C. FINANCIAL ASSISTANCE PAYMENTS. C-1

D. FLOODPLAIN AND WETLANDS ASSESSMENT D-1

E. INTERGOVERNMENTAL CORRESPONDENCE E-1

F. THE PROPOSED TENNESSEE SYNFUELS ASSOCIATES PLANT: PROCESS, CONSTRUCTION, AND SOURCE TERMS. F-1

G. AIR QUALITY MODELING AND EMISSIONS DATA SOURCES. G-1

H. ENVIRONMENTAL IMPACTS DUE TO MINING OF COAL. H-1

I. CORRESPONDENCE FROM TSA OFFICIALS. I-1

J. SEDIMENT AND RADIONUCLIDE TRANSPORT DUE TO DREDGING. J-1

K. HEALTH EFFECTS OF POTENTIAL POLLUTANTS FROM THE TSA FACILITY . . K-1

L. TRAFFIC CONGESTION L-1

LIST OF TABLES

Table 2-1 Initial Screening of Possible Sites, Relative Ranking by TSA 2-6

Table 3-1 Monthly Wind Data 3-6

Table 3-2 Wind Direction and Speed, Summary of Ten Years of Observation Taken at the McGhee Tyson Airport, Knoxville, Tennessee. 3-7

Table 3-3 Estimted Maximum Rainfall Over Various Time Periods For a Recurrence Interval of 100 Years at the Site. . . . 3-8

Table 3-4 Number and Percentage Occurrence by Months of the Pasquill Stability Classes A-G Using the CRBRP Onsite Data 3-10

balances and including all discharges and withdrawls from the river, are shown for the critical flow release from Melton Hill Dam of 14 cms (500 cfs) and for the average annual flow of 150 cms (5281 cfs). The greatest increases over ambient conditions are expected at the low river flow. The resulting copper concentrations, marginally above the fresh water aquatic life criterion under present conditions, would increase to levels 30 percent above the U.S. EPA recommended criterion mainly because of the CRBR copper loading of 1.6 kg/day (3.56 lbs/day). Impacts under average annual flow conditions would be small to minimal for all variables.

4.2.3.10 Dredging Effects. Much of the research on the effects of dredging has been carried out by the U.S. Army Corps of Engineers, Waterways Experiment Station, in conjunction with large-scale dredging operations in the Gulf of Mexico. Nevertheless, some of their findings can be useful in qualitatively defining the potential impacts of each dredge type. Most of the material in the following section is derived from two studies conducted for the Corps (Chen, et. al., 1976; Mobile District, 1979).

The limited amount of dredging (see Appendix F) would trigger both short-term (construction-related) and longer term effects. The alterations to the reservoir bottom would cause some minor changes in flow patterns. These changes would not be of large enough magnitude to affect permanently water temperatures, turbidity, dissolved oxygen, or other water quality parameters.

Dredging activities would cause a disturbance and redistribution of bottom sediments. An analysis of the effects of dredging of Clinch River sediments was conducted using both literature derived and site-specific data on dredging operations, sediment transport, and radionuclide concentrations. The methodology and results of this computation, discussed in greater detail in Appendix J, employs a set of conservative assumptions regarding factors controlling the anticipated sediment transport and desposition, thus approximating a worst case analysis. Furthermore, additional computations were made assuming that all of the radioactivity is associated with clay-sized particles, of which 90 percent remain suspended rather than settling to the river bottom.

APPENDIX J

SEDIMENT AND RADIONUCLIDE TRANSPORT DUE TO DREDGING

This appendix provides the methodology and computational detail for evaluation of the effects of dredging operations on the downstream movement of sediment and radioactivity. This material has been derived in part from the following two reports on the analysis of this issue:

- D'Appolonia Engineers, "Sediment Transport Impacts of Dredging," Report to Tennessee Synfuels Associates, February 1982, 31 pages, 6 tables, 9 figures.
- D'Appolonia Engineers, "Sediment Transport Impacts of Dredging, Phase 2", Report to Tennessee Synfuels Associates, May 1982, 13 pages, 1 table, 8 figures, 3 appendices.

J.1 Conclusions

An analysis of the effects of dredging of Clinch River sediments was conducted using both literature-derived and site-specific data on dredging operations, sediment transport, and nuclide concentrations. The methodology and results of this computation, discussed in greater detail below, employ a set of conservative assumptions regarding factors controlling the anticipated sediment transport and deposition, thus approximating a "worst case" scenario.

The highest concentrations of radionuclide would be present at the dredging site during the low flow period. For example, the maximum total beta and gamma emitting dosages are projected to occur at the barge unloading facility. The incremental dosages due to the TSA plant construction would be 1.1×10^{-5} millirem/yr. The sensitivity analysis shows that at the very worst the dosage could be a factor of two greater, which is still only 0.0006 percent of the allowable dose of 4 millirem/yr set by EPA.

Similarly, computations for alpha emitters indicate that the highest concentrations would occur at the railroad crossing and would be on the order of

J.2.2 Sediment Transport

The volume of sediment disturbed at each location is a function of the required excavation volume and the dredging method. Estimates of the depths and lateral extent were made based on experience and boring logs obtained from the dredging locations. These data and procedures are summarized in Table J-2.

An additional measure of conservatism in the approach is inherent in the decision not to reduce the sediment loss estimates to account for the likely use of a coffer dam or other flow diverting devices. A maximum rate of 50 cubic yards per hour was used together with loss estimates of 30 percent at the intake structure, railroad crossing, and outfall/diffusion structure and 20 percent at the barge unloading facility.

The materials to be excavated were classified visually by percent sand, silt, or clay in the Phase 1 study. Later particle size analysis conducted during Phase 2 confirmed most of the visual assignments and in some instances indicated the presence of higher percentages of silt and lower percentages of clay than originally estimated. Since the silt-sized particles are not transported as far downstream as the clay particles, the use of the Phase 1 data is conservative. Also required were dry unit weights in order to convert between volume and mass units. Literature values were used for the Phase 1 work based on the available particle size information and the consistency of the soils. Subsequent Phase 2 work confirmed these estimates within acceptable limits.

The median particle size specified by the Unified Soil Classification System (USCS) was used to compute the transport characteristics of the sediment. As stated above, further laboratory testing indicated the initial approach was conservative with respect to downstream transport.

These data, together with the computed suspended sediment source concentrations, are summarized in Table J-3. The sediment concentrations are the mass of sediment suspended per unit time divided by the flow rate in the initial control volume giving mass per unit volume.

Following is a step-by-step sample calculation to convert the flows and source concentrations of sediments into "worst case" estimates of downstream concentrations of radionuclides.

TABLE J-4. RADIONUCLIDE DISTRIBUTION IN CLINCH RIVER BED SEDIMENTS (PHASE 1)

DREDGING LOCATION	MATERIAL	ACTIVITY (picocuries/gram)						
		Am^{241}	Pu^{238}	$Pu^{239-240}$	Cm^{244}	Co^{60}	Cs^{137}	Sr^{90}
Water Intake Structure	Silt	-	0.002	0.002	-	-	0.143	0.329
	Clay	-	0.002	0.002	-	-	0.188	0.433
Railroad Crossing South Abutment	Silt	0.068	0.026	0.555	0.002	1.28	39.7	1.12
	Clay	0.089	0.035	0.731	0.002	1.68	78.5	1.47
Railroad Crossing North Abutment	Silt	-	0.001	0.005	-	-	3.13	0.149
	Clay	-	0.001	0.007	-	-	4.12	0.196
Barge Unloading Facility	Silt	-	0.008	0.154	-	0.326	23.0	0.462
	Clay	-	0.010	0.188	-	0.399	28.1	0.564
Outfall/Diffusion Structure	Silt	-	0.009	0.178	-	0.377	26.6	0.533
	Clay	-	0.012	0.234	-	0.496	35.0	0.702

TABLE J-5. RADIONUCLIDE CONCENTRATION IN CLINCH RIVER BED SEDIMENTS (PHASE 2)

ELEVATION (feet)	ACTIVITY (picocuries/gram) Pu^{238}	Pu^{239}	Co^{60}	Cs^{137}	Sr^{90}	Th^{228}	Th^{230}	Th^{232}	U^{234}	U^{235}	U^{238}	Pb^{212}	Pb^{214}	Tl^{208}	Bi^{212}	Bi^{214}	Ac^{228}	K^{40}
	Water Intake Structure																
730.2-725.5	0.015	0.0019	-	-	0.0074	0.50	0.41	0.43	2.0	0.060	0.19	0.38	0.44	0.49	0.50	0.44	0.50	11.0
	Railroad Crossing[a] South Abutment																
733.0-728.0 728.0-724.0	0.014 0.022	0.023 0.0035	0.10 -	7.0 0.06	0.16 0.008	0.38 0.23	0.41 0.29	0.38 0.22	2.4 1.8	0.076 0.079	0.21 0.16	0.32 0.26	0.37 0.34	0.38 0.33	0.48 0.48	0.38 0.35	0.39 0.33	8.5 8.8
	Railroad Crossing North Abutment																
725.0-722.6	0.020	0.0003	-	-	0.047	0.46	0.32	0.42	1.3	0.039	0.098	0.44	0.42	0.52	0.62	0.44	0.55	13.0
	Barge Unloading[a] Facility																
733.1-728.1 728.1-727.2	0.019 0.010	0.080 0.0004	0.14 -	9.4 0.14	0.15 0.002	0.36 0.31	0.42 0.22	0.39 0.31	2.1 3.0	0.060 0.086	0.22 0.17	0.30 0.20	0.33 0.16	0.32 0.27	0.60 -	0.43 0.14	0.39 -	9.1 2.4
	Outfall/Diffusion Structure																
733.0-728.3	0.012	0.0009	-	-	0.005	0.42	0.33	0.39	3.0	0.095	0.20	0.27	0.31	0.31	0.33	0.33	0.42	11.0

[a] The concentrations for these dredging locations were measured for two separate soil strata.

TABLE J-6. DOWNSTREAM RADIONUCLIDE CONCENTRATION IN THE CLINCH RIVER

RECEPTOR LOCATION (Clinch River Mile)	CLINCH RIVER ISOTOPE CONCENTRATION$^{(a)}$ (picocuries/liter)						
	ALPHA EMITTERS				GAMMA EMITTERS		BETA EMITTERS
	Am^{241}	Pu^{238}	$Pu^{239-240}$	Cm^{24}	Co^{60}	Cs^{137}	Sr^{90}
			Water Intake Structure				
13.0$^{(b)}$	--	0.0004	0.0004	--	--	0.0354	0.0815
12.0	--	0.0002	0.0002	--	--	0.0213	0.0491
6.0	--	0.0002	0.0002	--	--	0.0205	0.0472
1.5	--	0.0002	0.0002	--	--	0.0196	0.0452
			Railroad Crossing South Abutment				
11.5$^{(b)}$	0.0178	0.0069	0.1455	0.0005	0.3352	15.63	0.2927
10.5	0.0084	0.0033	0.0689	0.0002	0.1586	7.397	0.1386
6.0	0.0081	0.0032	0.0667	0.0002	0.1537	7.169	0.1343
1.5	0.0078	0.0031	0.0640	0.0002	0.1474	6.871	0.1287
			Railroad Crossing North Abutment				
11.5$^{(b)}$	--	0.0002	0.0013	--	--	0.8201	0.0390
10.5	--	0.0001	0.0007	--	--	0.3881	0.0185
6.0	--	0.0001	0.0006	--	--	0.3762	0.0179
1.5	--	0.0001	0.0006	--	--	0.3605	0.0172
			Barge Unloading Facility				
10.5$^{(b)}$	--	0.0021	0.0407	--	0.0862	6.085	0.1220
10.0	--	0.0013	0.0244	--	0.0518	3.650	0.0732
6.0	--	0.0013	0.0237	--	0.0502	3.540	0.0710
1.5	--	0.0012	0.0224	--	0.0476	3.360	0.0673
			Outfall/Diffusion Structure				
10.0$^{(b)}$	--	0.0017	0.0329	--	0.0697	4.919	0.0986
9.0	--	0.0010	0.0200	--	0.0425	2.997	0.0601
6.0	--	0.0010	0.0196	--	0.0416	2.938	0.0589
1.5	--	0.0010	0.0188	--	0.0399	2.815	0.0564

(a) Isotope concentration equals the isotope activity in the bed sediments times the concentration of material in the Clinch River.

(b) Denotes the Clinch River mile location where dredging will occur.

TABLE J-7. RESULTS FOR COMPARISON WITH REGULATORY FRAMEWORK

RECEPTOR LOCATION (Clinch River Mile)	DOSE OF BETA AND GAMMA EMITTERS[(a)] (millirems/year)				CONCENTRATION OF ALPHA EMITTERS[(b)] (picocuries/liter)
	Co^{60}	Cs^{137}	Sr^{90}	TOTAL β AND γ	TOTAL α
			Water Intake Structure		
13.0[(c)]	--	6.123×10^{-8}	5.418×10^{-7}	6.030×10^{-7}	0.0002
12.0	--	3.684×10^{-8}	3.264×10^{-7}	3.632×10^{-7}	0.0004
6.0	--	3.546×10^{-8}	3.138×10^{-7}	3.493×10^{-7}	0.0004
1.5	--	3.390×10^{-8}	3.005×10^{-7}	3.344×10^{-7}	0.0004
			Railroad Crossing South Abutment		
11.5[(c)]	6.001×10^{-8}	2.703×10^{-5}	1.946×10^{-6}	2.904×10^{-5}	0.1707
10.5	2.840×10^{-8}	1.279×10^{-5}	9.214×10^{-7}	1.374×10^{-5}	0.0808
6.0	2.752×10^{-8}	1.240×10^{-5}	8.928×10^{-7}	1.332×10^{-5}	0.0782
1.5	2.639×10^{-8}	1.188×10^{-5}	8.556×10^{-7}	1.276×10^{-5}	0.0751
			Railroad Crossing North Abutment		
11.5[(c)]	--	1.418×10^{-6}	2.593×10^{-7}	1.677×10^{-6}	0.0015
10.5	--	6.713×10^{-7}	1.230×10^{-7}	7.943×10^{-7}	0.0008
6.0	--	6.507×10^{-7}	1.190×10^{-7}	7.697×10^{-7}	0.0007
1.5	--	6.235×10^{-7}	1.143×10^{-7}	7.378×10^{-7}	0.0007
			Barge Unloading Facility		
10.5[(c)]	1.543×10^{-8}	1.052×10^{-5}	8.111×10^{-7}	1.135×10^{-5}	0.0428
10.0	9.274×10^{-9}	6.313×10^{-6}	4.866×10^{-7}	6.809×10^{-6}	0.0257
6.0	8.988×10^{-9}	6.123×10^{-6}	4.720×10^{-7}	6.604×10^{-6}	0.0250
1.5	8.522×10^{-9}	5.811×10^{-6}	4.474×10^{-7}	6.267×10^{-6}	0.0236
			Outfall/Diffusion Structure		
10.0[(c)]	1.248×10^{-8}	8.508×10^{-6}	6.555×10^{-7}	9.176×10^{-6}	0.0346
9.0	7.609×10^{-9}	5.184×10^{-6}	3.995×10^{-7}	5.591×10^{-6}	0.0210
6.0	7.448×10^{-9}	5.082×10^{-6}	3.916×10^{-7}	5.481×10^{-6}	0.0206
1.5	7.144×10^{-9}	4.869×10^{-6}	3.749×10^{-7}	5.251×10^{-6}	0.0198

(a) Dose of beta and gamma emitters in total body for a single intake of two liters of Clinch River water.
(b) Concentration of alpha emitters in Clinch River water.
(c) Denotes the Clinch River mile location where dredging will occur.

Mr. RIVKIN. When I discuss dereliction in meeting Federal environmental responsibilities, I would like to very briefly mention a few of the relevant Federal environmental laws that I believe have not been complied with by DOE.

First, we have the National Environmental Policy Act of 1969. I can go into a long lecture, as I do in my classes, about NEPA. I will not do that; NEPA is the foundation of Federal decisionmaking on the environment. DOE has published what they call environmental assessments concerning the Y-12 facility.

If the Y-12 facility is not a major Federal action significantly affecting the quality of the human environment under NEPA, I am not sure what is. Why they have failed to do a full environmental impact statement is not clear from the record.

I believe there was a memo read earlier by you, Mr. Gore, indicating that the NEPA process would incorporate statements by other—and analysis by other—relevant agencies, including TVA. I believe they are in violation of NEPA for not preparing a full environmental impact statement on this facility.

There is the Comprehensive Environmental Response, Compensation and Liability Act of 1980, otherwise known as the Superfund. Representative Lloyd questioned before whether DOE had any responsibilities under that act, not for cleanup, but for notification.

I would direct you to section 103(a) of that act, and I will not read it, but it plainly includes Federal facilities as a person having responsibility for reporting under that act. I will be happy to go through it with you, but I do not think this is the time.

Mr. GORE. Without objection, we will include the text of that particular regulation for the record and let it speak for itself.

Mr. RIVKIN. Thank you.

Next we have RCRA, the hazardous waste law. Again, a full analysis of the question of RCRA applicability is simply beyond the scope of this statement. We have included some analysis of it in our written statement. Suffice it to say that I believe that DOE's interpretation of the RCRA applicability question is at best crass and at worst is at war with congressional intent and congressional practice regarding compliance of Federal facilities with that law. One has to look at that law more generally other than seizing on the word "activity" in that particular section. One has to look how Congress addressed the question of Federal facility compliance in the amendments to the Clean Water Act, the Clean Air Act of 1977.

There is a long history as well as a Law Review article. I only give my considered opinion that RCRA does apply to—certainly to nonhazardous wastes generated from DOE facilities, and I also believe it applies to mixed wastes. There is a question there, and I believe it will be at the forefront of any litigation on this question.

I should note here that EPA's general counsel on June 22, 1983, provided an opinion agreeing with our position, following our notice letter of June 11, 1983. I would also note that it has taken EPA some 7 years since RCRA was enacted in 1976 to come to some conclusion on this question, and I would ask the subcommittees to explore why this period of time passed before there was a definitive ruling on this question.

There is a National Pollutant Discharge Elimination System, which is required under the Clean Water Act amendments of 1977 and 1972. I am not going to go into that in great detail. I do believe that the permits that have been written for this facility are inadequate, that EPA—to answer a question that you asked before, Mrs. Lloyd, has abused its discretion by not including mercury and other parameters in that permit.

The point source discharge that Mr. Zeller referred to was a collection of all of these hundreds of pipes that we have heard about today at one point. I believe it does—it has very little to do with whether mercury was in the process. DOE knew there was a discharge of mercury into the creek, let us charitably say, in 1977. I believe EPA did not have that information and therefore was not able to write an intelligible permit.

This omits totally the question of why there were so many hundreds of unpermitted discharges, why those pipes—which is at the heart of what the Clean Water Act is all about—were not subject to permit requirements, as the State now requires. And this is one reason why we believe that the MOU is inadequate. I understand the need for more data, but giving DOE until December to deal with this question, we believe is much too long.

Our recommendations, I am afraid, are rather modest. Initially, we believe that DOE should be required to create an independent advisory committee, which includes nonexpert interested citizens as well as expert scientists, to advise DOE on questions pertaining to environmental protection. Whether this is part of the task force or not, it seems to me it has to be worked out.

This solution of this situation has worked very well in the TVA air pollution controversy when an implementation committee, composed of citizens, representatives of the plaintiff organization, has worked with TVA hand-in-hand in compliance with the consent decree in that situation. There is precedent for it, and I believe it is necessary, given the distrust that exists here.

Second, we believe that it is important for this committee to conduct a full inquiry into why DOE has failed to comply with its obligations under these environmental laws, and I fully believe Mr. Wing and all the individuals here when they say it reaches into Washington.

I know the subcommittee would be interested in hearing why some of the opinions that we have heard, legal opinions, have been generated, what the basis is. And I believe that is an appropriate area of further inquiry by the subcommittee.

I have a number of other specific recommendations in my report. I would finally say that we would urge that all material before this subcommittee, including movies and documents and the like, be made public so that a full record of this hearing can be available, either in the hearing record or in some acceptable form for future followup.

Thank you for the opportunity.

[The prepared statement of Mr. Rivkin follows:]

Oak Ridge, Tennessee
July 11, 1983

SUMMARY OF TESTIMONY OF THE LEGAL ENVIRONMENTAL ASSISTANCE FOUNDATION BEFORE THE SUBCOMMITTEES ON INVESTIGATIONS AND OVERSIGHT AND ENERGY RESEARCH AND PRODUCTION OF THE HOUSE SCIENCE AND TECHNOLOGY COMMITTEE

My name is Dean Hill Rivkin. I am Professor of Law at the University of Tennessee College of Law, and I appear today as a board member of the Legal Environmental Assistance Foundation (LEAF), a regional public interest law firm devoted to the protection of the environment. One of LEAF's primary objectives is to ensure that governmental entities, as well as private industries, scrupulously comply with all relevant environmental laws and regulations.

For us, the overarching question in the present hearings is whether DOE has fulfilled its environmental obligations under applicable law. Following an examination of documents before this Committee, we have concluded that DOE has been seriously derelict in meeting its substantial legal and environmental responsibilities to the people of this area. We believe it is important to examine DOE's past environmental performance -- relating to mercury, as well as other aspects of its operations -- so that lessons to guide the agency's future conduct can be intelligently formulated. We believe the problems are systemic and institutional, and solutions must incorporate this reality.

In the limited time available today, in addition to our written testimony (which we would like made part of the record), I would like to suggest five propositions that I believe are amply supported by the record your subcommittees have gathered:

1. DOE, INSTITUTIONALLY, CANNOT BE TRUSTED TO REGULATE ITS OWN ENVIRONMENTAL AFFAIRS.

2. DOE, INSTITUTIONALLY, CANNOT BE TRUSTED TO APPROACH ENVIRONMENTAL CONCERNS WITH FULL SCIENTIFIC OBJECTIVITY.

3. DOE, INSTITUTIONALLY, CANNOT BE TRUSTED TO OBEY THE FULL LETTER AND SPIRIT OF ALL APPLICABLE ENVIRONMENTAL LAWS.

4. DOE, INSTITUTIONALLY, CANNOT BE TRUSTED TO DEAL OPENLY WITH STATE AND FEDERAL REGULATORY BODIES.

5. DOE, INSTITUTIONALLY, CANNOT BE TRUSTED TO PROVIDE FULL AND IMPARTIAL INFORMATION TO THE PUBLIC ON MATTERS OF SERIOUS ENVIRONMENTAL AND HEALTH CONCERN.

What I would like to do for the remainder of my time is to illustrate these propositions with examples gleaned from state and federal records involving the mercury spill and other environmental aspects of DOE's operations.

* In its December, 1982, Environmental Assessment entitled "Y-12 Plant Site, Oak Ridge, Tennessee," DOE failed to acknowledge the uncertain dimensions of the mercury spill and concluded:

> Impacts from the continued operations are minimal or negligible for land use, hydrology, and archaeology. Y-12 is an integral contributor to Oak Ridge's economy and any change will have a profound effect on the community. The only major area of environmental concern involves particulate emissions from the Y-12 steam generation plant.

Relevant excerpts from this wholly inadequate Environmental Assessment are included as attachment #1 to this summary.

* In its August, 1982, Draft Environmental Impact Statement entitled "Sale of Segment O to the City of Oak Ridge," which concerned the proposed construction of a large synthetic fuels plant by the Koppers Company, DOE failed to disclose any information concerning the possibility of mercury contamination at a Clinch River site where dredging was proposed. DOE failed to disclose this information despite a request by local citizens that a thorough study of the impact of dredging be conducted.

* In a May 6, 1977, memo concerning mercury pollution from J.F. Wing, Chief of DOE's Environmental Protection Branch to W.H. Travis, Director of DOE's Safety and Environmental Control Division, Wing stated:

> TVA would also tend to illustrate the situation in Poplar Creek relative to other areas where mercury levels are above normal and would do so for a number of years. This would be much better an approach than the publication of a set of limited data with various conclusions or hypotheses on cause and effect relationships. This type of information could reach the local public

> in an aberrant perspective and cause undue concern over non-existent health hazards or relatively insignificant environmental matters.

A copy of this memo is included as attachment #2 to this summary.

* As late as Spring, 1983, DOE failed to disclose to the state and the public that it was aware of mercury contamination far exceeding the 1966 spill, despite requests by the state for full information as early as October, 1982.

* In a November 1, 1976, letter from Stephen Anderson, Basin Planning Section, Tennessee Division of Water Quality Control, to William Travis, the state expressed its extreme dissatisfaction with DOE's (then ERDA) cooperation in supplying data necessary for the state to comply with its legal mandate under state and federal water laws. The letter stated:

> I have attempted to answer each of the questions raised in your telegram. I have necessarily been detailed since I feel it is imperative to dispute that ERDA has been cooperative with the Division and that this Division has not given careful consideration to ERDA comments. To generally answer your contention that the Basin Planning Section has not considered ERDA's comments, I must answer that we made every attempt to accurately describe water quality in the Clinch River basin. Both my staff and the Knoxville staff have spent countless hours reviewing our files and attempting to gain first hand knowledge of the Oak Ridge facilities. Unfortunately, this information has been limited.

* The recently executed MOU is more a public relations document than a legally enforceable blueprint for resolving the host of serious water quality and hazardous waste problems that exist at Y-12. The MOU utterly lacks enforcement authority, allows the continuing dumping of unregulated hazardous waste, and gives DOE until December, 1983, to obtain water quality permits that should have been obtained years ago. The MOU also fails to recite specific violations of the Federal Clean Water Act of 1977, the Resource Conservation and Recovery Act of 1976, and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980. Because LEAF believes that DOE's environmental record justifies stricter regulatory action, on June 9, 1983, we sent a sixty-day letter expressing our intention to file citizen suits over these violations. A copy of this letter is included as attachment #3 to this summary.

* DOE's position that it is exempt from the requirements of the Resource Conservation and Recovery Act of 1976 governing nonnuclear hazardous waste is unfounded. Until quite recently, EPA's position on this issue was also ill-considered.

* DOE's resistance to recent EPA proposed air quality standards for airborne radioactive pollutants reflects DOE's continuing opposition to meaningful environmental accountability.

* DOE has violated the National Environmental Policy Act of 1969 by failing to prepare adequate environmental impact statements for Y-12 or the entire Oak Ridge Reservation.

* DOE has violated Executive Order 12088 entitled "Federal Compliance With Pollution Control Standards." A copy of this Order is included as attachment #4 to this summary.

RECOMMENDATIONS

We urge that, based on the lessons learned through these hearings, a number of steps be taken to ensure that DOE's future environmental conduct is not contaminated by its past mistakes. Among these steps are:

1. Creation of an independent advisory committee, including nonexpert citizens, to advise DOE on questions pertaining to environmental protection.

2. A full Congressional inquiry into DOE's compliance nationwide with environmental laws, particularly those relating to hazardous waste and toxic pollutants.

3. Clarification of all relevant environmental laws expressly to include DOE's activities.

4. Preparation of an environmental impact statement examining all aspects of the Oak Ridge Reservation.

5. Amendment of the MOU to provide stricter compliance deadlines and mechanisms for enforcement.

6. Full release of all information bearing on these questions that is in possession of these subcommittees.

DOE/EA-0182

ENVIRONMENTAL ASSESSMENT

Y-12 PLANT SITE
OAK RIDGE, TENNESSEE

DECEMBER 1982

U.S. DEPARTMENT OF ENERGY
OFFICE OF MILITARY APPLICATION

SUMMARY

The Oak Ridge Y-12 Plant, operated by Union Carbide Corporation, Nuclear Division, under contract to the U.S. Department of Energy (DOE), has five major responsibilities:

- production of nuclear weapons components
- fabrication support for weapon design agencies
- support for other UCC-ND installations
- support and assistance to other government agencies
- processing of source and special nuclear materials

This Environmental Assessment describes the ongoing operations of Y-12 and evaluates the actual and possible impacts on the environment that continuation of these operations entails. Transportation operations external to the Y-12 Plant are not addressed in this document. Since the plant predates the National Environmental Policy Act of 1969 (NEPA) by over two decades, there previously has been no overall formal retrospective environmental assessment of the whole of its facilities and operations.

Y-12 is located on the DOE Oak Ridge Reservation adjacent to the city of Oak Ridge, Tennessee. The plant and auxiliary facilities occupy 1,384 ha (3,420 acres). It includes approximately 300 buildings plus several disposal sites. These include Rogers and Kerr Hollow Quarries and the sanitary landfill.

Y-12 is located within the Great Valley of the Tennessee River. The plant is situated in Bear Creek Valley at the eastern boundary of the Oak Ridge Reservation. Altitudes range from 226 m (741 ft) to 413 m (1,356 ft) for the subparallel ridges and valleys. Geologic formations are of sedimentary origin. The resultant soils are primarily not suitable for agricultural practice on Y-12 property even though the surrounding region is agrarian in nature. Y-12 is a primary employer in the manufacturing sector of the area.

Y-12 is within the Clinch River drainage system. Two streams are associated with Y-12 operations: the East Fork Poplar Creek and Bear Creek. Each stream has received Y-12 effluent discharges, among others, and has experienced moderate pollution. * Accidental discharges of polychlorinated biphenyls (PCB) and mercury have occurred in the past. However, critical concentrations have not been recorded in the water, sediments, or biota. The Plant currently meets National Pollutant Discharge Elimination System (NPDES) permit requirements. No flooding has occurred at the Y-12 Plant.

Humid continental climate characterizes the area with mild winters and hot summers being the norm. Precipitation is evenly distributed throughout the year. Low-level inversions are frequent and fall is usually the season with the greatest number. Because of this air stagnation potential, air pollution is a real concern. Although the Y-12 Plant area meets national ambient standards, sulfur dioxide and particulate emissions have, in the past, exceeded source emission concentrations. Y-12 has rectified the sulfur dioxide problem by switching to low sulfur coal as the primary fuel source at the steam generation plant. Funding has also been approved to provide facilities at the steam generation plant to reduce particulate emissions.

Biota characteristic of the Appalachian oak forest region are abundant. Most frequent dominant tree species include northern red oak, chestnut oak, and yellow poplar. Representative animals include whitetail deer, fox squirrel, pine vole, cotton mouse, and opossum. No threatened or rare plants are known on Y-12 facilities. Although endangered animals exist on the reservation, none have been reported on the Y-12 industrial facilities and, hence, the probability of impact is negligible.

No archaeological sites or historic properties are located on Y-12 lands.

Alternatives considered in this assessment are:

1. No Action - Continued operation of the Y-12 Plant with limitation of adverse impacts by improved pollution control technologies (e.g., waste treatment) as they become available. No plant expansion is scheduled.

2. Discontinue Y-12 Plant operations.

3. Relocate Y-12 Plant operations.

4. Reduce Y-12 Plant operations.

Only the preferred action of continued operation is viable. The other alternatives either only shift environmental impacts to other areas or represent unrealistic solutions.

Impacts from releases of radioactivity to the atmosphere from routine operations were found to be minimal. A small probability exists for accidental releases of radioactivity. A conservative evaluation of an accident involving a fire in a filtering system in a facility processing enriched uranium showed that the release of five kilograms of enriched uranium would expose individuals residing one-half mile north of the plant to 0.02 rem or 13 percent of the exposure to the general public permitted by DOE standards.

Releases of nonradioactive chemicals would have some impacts on the environment. These impacts, however, are not believed to be injurious to the general public. Due to the variety of chemicals used in the plant, several accidental releases were postulated. Atmospheric releases involving a fire in a building which contains significant quantities of mercury and a release of hydrogen fluoride as the result of a cylinder valve breakage were evaluated. In both cases, concentrations of these materials were calculated at the closest residences which exceeded exposure standards but were below levels considered by OSHA to be immediately hazardous to life and health. An accident involving spillage of acid during a transfer operation was found to do temporary damage to the ecosystem in the stream draining the plant area.

!?

Impacts from the continued operations are minimal or negligible for land use, meteorology (air quality), biology, hydrology, and archaeology. Y-12 is an integral contributor to Oak Ridge's economy and any change will have a profound effect on the community. The only major area of environmental concern involves particulate emissions from the Y-12 steam generation plant. Therefore, funding has been approved for the installation of pollution abatement equipment, i.e., baghouses, be installed to reduce particulate emissions. Despite current compliance with permits, regulations, and standards for effluent and surface stream water quality, improved environmental control is recommended for surface water discharge, wastewater treatment, PCB disposal, and coal storage. Some of these improvements are currently under consideration or are being implemented.

Due to unforeseen delays in the completion of this report, much of the data presented is several years old. However, since conditions in the Oak Ridge area and the Y-12 Plant have not changed significantly in this period, the data presented is typical of present conditions.

UNITED STATES
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
OAK RIDGE OPERATIONS
P. O. BOX E
OAK RIDGE, TENNESSEE 37830

AREA CODE 615
TELEPHONE 483-8611

May 6, 1977

W. H. Travis, Director,
Safety & Environmental Control Division

MERCURY IN FISH IN POPLAR CREEK; MEETING WITH TVA'S DIVISION OF ENVIRONMENTAL PLANNING, CHATTANOOGA, TENNESSEE

The subject meeting was held May 4, 1977, with myself and J. K. Alexander representing ORO's Environmental Protection Branch, Mr. Harold Abee representing UCCND and Messrs. W. B. Nicholas, R. J. Ruane and Jack D. Milligan representing TVA.

The TVA personnel were provided a summary of the raw data now available for Mercury in Poplar Creek and Clinch River Fish. The summary was compiled by Mr. Abee from UCCND 1976 sampling and analysis data. This summary is attached (Enclosure 1.).

After examining the data, all three TVA representatives were interested in the elevated levels found; but were not alarmed in any way. They noted that the concentrations found in the Poplar Creek fish were similar to those now seen for fish in Pickwick Lake and Kentucky Lake. Graphs showing these levels are also attached for reference (Enclosure 2.). No restrictions for game or commercial fishing are in effect on these reservoirs at this time. TVA has an on-going program for measuring mercury-in-fish trends in all its reservoirs. More emphasis has been given to Cherokee, Chicamauga, Pickwick and Kentucky Lakes, where levels of some concern have been observed (i.e., exceeding the proposed FDA limit of 0.5 ppm in fish flesh).

Of greatest concern to the TVA monitoring effort at this time are the levels being found in the upper reaches of the North Fork of the Holston River, specifically just below the discharges from a chlor-alkali plant in southwestern Virginia. Average concentrations in various species in these waters range from 2 to 3 ppm.

Up to this point, our discussions with TVA indicated that, taken in the proper perspective, the elevated levels of mercury found in the little-used Poplar Creek fishery do not constitute either a health hazard or a potential irreversible threat to the local environment.

Mr. Milligan, with the Division of Environmental Planning's Special Projects Staff, expressed positive interest in TVA adding the Poplar Creek area to their other monitoring locations. Mr. Milligan is probably the single TVA employee most interested in the mercury in fish and river sediment monitoring program. He was curious about the source of mercury in the creek and seemed satisfied with our conjectures. He requested that we provide any mercury in sediment data we might have to complement the fish data provided. He also concurred with our assumption that, in the absence of any significant on-going mercury discharges from Y-12 or ORGDP, mercury in creek sediment must be the source of the mercury in the fish.

Mr. Nicholas, Chief of DEP's Water Quality Branch, indicated that before TVA could become involved in additional sampling and monitoring for mercury in fish at ORGDP, Mr. Peter Krenkal, Director of the Division of Environmental Planning, would have to consider whether this monitoring would actually fit into TVA's purposes for monitoring fish for mercury in the Valley, particularly since this monitoring program's budget is currently being cut back. Mr. Nicholas also indicated that the State of Tennessee participates in TVA's current program and if the program were expanded to measuring trends in Poplar Creek, the State would be involved. Not withstanding several unresolved issues with the State of Tennessee, we do not believe State involvement in a formal, relatively long-term monitoring effort would create any new problems between ORO and the State.

Mr. Ruane, supervisor of the Aquatic Biology and Ecology Section, seemed interested in an agreement whereby ERDA/UCCND would collect the samples and provide them to the TVA Fisheries Lab in Norris for analysis. He indicated that the costs TVA would not incur in having to collect the extra fish samples could make it possible for TVA to include the Poplar Creek site in their analysis program at the current budget level. We remained noncommittal on supplying specimens, as the collection frequencies and sample populations that might be required could constitute too large a cost for ERDA or UCCND.

Overall, our discussions with TVA were enlightening and helpful. We are hopeful that TVA will choose to work with ERDA and UCCND and add the Poplar Creek site to their trend monitoring program. We believe this would be beneficial in that the Federal Agency in this region that is specifically recognized to have the responsibility for characterizing water quality and ecological stress conditions would, in fact, be performing that function at the mouth of Poplar Creek. TVA would also tend to illustrate the situation in Poplar Creek relative to other areas where mercury levels are above normal, and would do so for a number of years. This would be much better an approach than the publication of a set of limited data with various conclusions or hypotheses on cause and effect relationships. This type of information could reach the local public in an aberrant perspective and cause undue concern over non-existent health hazards or relatively insignificant environmental matters.

*

J. F. Wing, Chief
Environmental Protection Branch

OSE:JKA

Enclosures:
1. 1976 ORO Analysis
2. 1970-1975 Pickwick & Kentucky graphs

CC w/encls:
V. J. D'Amico /
B. D. Hickman
H. D. Fletcher
Jim Alexander, PIO
H. H. Abee, Y-12

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RAY BLANTON
Governor

Eugene W. Fowinkle, M.D., M.P.H.
Commissioner

STATE OF TENNESSEE
DEPARTMENT OF PUBLIC HEALTH
NASHVILLE 37219

621 Cordell Hull Building

November 1, 1976

Mr. William H. Travis, Director
Safety and Environmental Control Division
United States Energy Research and
Development Administration
Oak Ridge Operations
Post Office Box E
Oak Ridge, Tennessee 37830

Re: Clinch River Basin Plan

Dear Mr. Travis:

Your telegram of October 27, 1976 to Mr. John W. Saucier, Director, Tennessee Division of Water Quality Control, has been referred to me for reply. The telegram described your concern about erroneous and/or incomplete statements in the Clinch River Basin Plan (Final Draft) relative to U.S. ERDA facilities in the Oak Ridge area. I will attempt to answer your comments in the order presented in the telegram.

> Your comment: "In reviewing excerpts provided from final draft, we were disappointed to note that the majority of our comments regarding factual errors were ignored and that the implication that ERDA facilities are uncooperative is even more evident."
>
> My response: I disagree that your comments were ignored. Tables 10, 12, 16, and 24 of the Final Draft have been corrected exactly as suggested in your letter to me of June 4, 1976. That letter also contained an additional 15 pages of single spaced "suggested rewording." You seemed to be dissatisfied with our composition and writing style in every reference to an ERDA facility. Many of your "suggested rewordings" were, in my opinion, of little significance. It is this Division's policy to be informative as well as technically correct and, therefore, much of the body of the plan was written in general layman's language.

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The State of Tennessee has been under considerable pressure from the U. S. Environmental Protection Agency to complete its 13 basin plans. We had, in fact, committed to finishing all plans in draft form by July 1, 1976. The public hearing on the Clinch

River basin plan was held in Clinton on April 29, 1976. According to the attendance list for that hearing, the meeting was attended by two representatives of ERDA, one representative of ORNL, and one representative of Union Carbide Corporation (Oak Ridge). No public statements were made by any of the four. We stated that the transcript would be held open for thirty days after the hearing. The only comments received from ERDA were received in my office on June 7, 1976, or nine days after the official hearing transcript was closed. However, my staff did review each point of your letter and made substantive changes as you requested. While, due to time constraints, we were unable to make the editorial changes you suggested, we did reexamine our descriptions of ERDA facilities to insure that they were technically correct. I have today compared the final draft of the plan with your June 4 letter, and I fail to find any "factual errors" as described in your telegram.

Your comment: "We believe that our desire to cooperate is demonstrated by the progress discussed in our comments on the preliminary draft and by our continuing efforts to provide information to the Division of Water Quality Control."

My response: In my various positions with the Division (Knoxville Regional Office, Waste Treatment Section, and now Basin Planning Section) I have failed to see this referred to cooperation. I have this morning briefly reviewed the past few years and have the following comments on ERDA cooperation with the Division of Water Quality Control:

- A public hearing was held in Knoxville on February 9, 1967 for the purpose of discussing the document "Water Uses, Stream Standards and Implementation Plans for Interstate Streams for Tennessee-1967." In commenting on industrial waste discharges to the Clinch River, the then Stream Pollution Control Board stated..."The first source of industrial waste entering the Clinch River is the Atomic Energy Plant at Oak Ridge. This plant is a producer of radioactive materials. The only significant releases of radioactive materials to the Clinch River are the extensively monitored discharges through White Oak Dam on White Oak Creek. The only other major discharge from the Atomic Energy Plant involves large amounts of cooling water which enter directly into the Clinch River and this does not constitute a stream pollution problem." That statement, which was based on the best information available to the Division at that time, was obviously incorrect. As shown on the attendance list for that meeting, there were nine representatives of the AEC, ORNL, or Union Carbide present at that meeting. None made a statement at the hearing nor was any clarification received after the hearing.

- The Stream Pollution Control Board, in a public meeting on May 26, 1967, adopted the water quality standards presented to the public in the above described February 9, 1967 hearing. Based again on lack of information and without suggested correction from AEC, the Board described AEC facilities as "satisfactory treatment...no additional treatment needs in forseeable future." This again was an obviously erroneous statement.

- The Stream Pollution Control Board held a public hearing in Clinton on January 19, 1971 for the purpose of discussing the document "Water Uses, Stream Standards and Implementation Plans for All Streams within the Clinch River Basin - 1971." The staff presented, for the first time, specific information concerning AEC facilities in the basin. The only problems presented at that time were "problems have been reported concerning the formation of radioactive seeps from disposal pits which are located in the White Oak Lake drainage area" and "...seepage from the ponds (at Y-12 plant) has resulted in some problem with excessive nitrate levels in Bear Creek headwaters." Eleven representatives of AEC, ORNL, and Union Carbide attended the hearing; none made any public statement. For the first time, however, comments were received after the hearing. In a letter dated January 26, 1971, Mr. S. R. Sapirie, Manager of AEC's Oak Ridge Operations, requested that streams within the AEC-Oak Ridge Reservation be classified as "reserved research streams" since they are "...continuously used in ecological research including studies on radionuclide cycling in aquatic organisms." Mr. Sapirie further described the stream sides and lake bed of White Oak Lake as containing "deposits of radioactivity which present a unique research medium." Mr. R. F. Hibbs, President of Union Carbide Corporation, Nuclear Division, called the staff's attention to "the need for further consideration of the proposed classifications for certain streams in the Oak Ridge area." Neither the AEC nor the Union Carbide letter, or any other subsequent correspondence, discussed the technical inaccuracies which the staff was using to describe AEC wastewater facilities.

- As I have worked in both the Knoxville Regional Office and the Division's Waste Treatment Section, I have observed AEC's (and ERDA's) reluctance to submit information to the Division concerning waste treatment facilities. Such submission of information is required by State law (Tennessee Code Annotated Section 70-329(k)). Some examples I am personally familiar with, such as:

  The domestic sewage treatment plant at ORNL was recently expanded and upgraded. As a courtesy, plans and specifications were submitted to the Division. Since the proposed plant design did not comply with the State's design criteria, Mr. C. E. Lingerfelt, formerly of our Knoxville office, rejected the plans and made suggestions for correction. Those suggestions were ignored and the plant was built as designed. This plant is presently not meeting effluent standards, particularly ammonia nitrogen, as described in the Clinch River Basin Plan and as inferred in your June 4, 1976 letter.

On August 29, 1975, Mr. Earl Leming and I attended a meeting at the Oak Ridge facilities for the purpose of learning about plans for a denitrification facility at the Y-12 plant. This elaborate nitrogen removal facility was obviously competently designed. In fact, I understand its developers presented a paper describing their findings at the 1976 Purdue University Industrial Waste Conference. To this date, I am unaware of any formal presentation of this waste treatment facility design to the State of Tennessee.

Your June 4 letter suggests that several additional facilities have been constructed or are planned, e.g. new sanitary waste treatment facility for ORGDP, special facility for disposal of Kerr Hollow reactive metals. The September 5, 1976 issue of the Chattanooga Times carried a story which described "a 1.3 million dollar facility for the treatment of chemical and low-level radioactive wastes at the Oak Ridge National Laboratory." The Division of Water Quality Control is completely unaware of these future facilities.

Your staff has described to us a waste treatment facility at K-25 for the treatment of long chain organic wastes. The wastewater characteristics are, we are told, "classified information." The Division of Water Quality Control has received no information on this facility.

Your comment: "Subsequent to submission of our comments, we received request from members of Mr. Leming's staff to conduct NPDES compliance monitoring at Oak Ridge facilities. We agreed to this request and provided access to all NPDES discharge points. To the best of our knowledge, this monitoring revealed no problem areas which had not been previously discussed in detail with both State and EPA personnel."

My response: True. However, I feel that such a statement leaves a false impression since it implies that data for the Oak Ridge facilities are readily available to the Division. I have quickly had our Knoxville and Central office files checked and have found no data prior to 1970. In fact, Mr. Leming made this Division's first detailed inspection of some Oak Ridge facilities that same year. Although we had made several previous requests, no data showing noncompliance with effluent limitations were sent to our Division prior to January 1976. Obviously, this information was submitted because it is a requirement of NPDES - the federal permit system. Additionally, the Division participated in establishment of NPDES effluent limitations at its own insistence; we were not asked by ERDA to participate. As far as our files show, no information on noncompliance has been voluntarily submitted to this Division. We have received other reports concerning waste treatment at the Oak Ridge facilities; however, such are usually in the form of technical reports which are normally available to the public as ERDA research papers.

I have attempted to answer each of the questions raised in your telegram. I have necessarily been detailed since I feel it is imperative to dispute that ERDA has been cooperative with the Division and that this Division has not given careful consideration to ERDA comments. To generally answer your contention that the Basin Planning Section has not considered ERDA's comments, I must answer that we made every attempt to accurately describe water quality in the Clinch River basin. Both my staff and the Knoxville staff have spent countless hours reviewing our files and attempting to gain first hand knowledge of the Oak Ridge facilities. Unfortunately, this information has been limited. Unlike most other dischargers, which are regulated by the State of Tennessee, ERDA apparently has chosen to comment on our documents (stream use classifications and basin plans) after they have been completed rather than voluntarily submit information to us or so state disagreements at public hearings. It is interesting to note that while ERDA has been well represented at public hearings, it has yet to make one comment to us in public.

Again, I must state that all substantive changes requested by ERDA were made in the final draft. The Clinch River Basin Plan was adopted by the Water Quality Control Board in a public meeting on October 27, 1976.

I am available at any time to discuss with you the basin plan or any other matters.

Very truly yours,

Stephen E. Anderson

Stephen E. Anderson
Basin Planning Section
Division of Water Quality Control

SEA:qec

cc: Mr. James L. Church
Tennessee Department of Public Health
cc: Mr. John W. Saucier
cc: Mr. Wm. Harold Martin
cc: Mr. Bill Graham
Occupational and Radiological Health
cc: Mr. A. G. Linton, EPA - Region IV
cc: Mr. J. F. Wing, U.S. ERDA

LEGAL ENVIRONMENTAL ASSISTANCE FOUNDATION
CENTRAL APPALACHIAH OFFICE
602 GAY STREET, SUITE 507 • KNOXVILLE, TENNESSEE 37902 • 615-637-5172

June 9, 1983

Mr. Donald Hodel
Secretary
U.S. Department of Energy
Washington, D.C. 20585

Dear Mr. Hodel:

Section 505(b) of the Clean Water Act, 33 U.S.C. Section 1365(b), and Section 7002 of the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. Section 6972(b) and (c), require that sixty days prior to the filing of a citizen suit in federal court against an alleged violator, notice must be given of the alleged violations to the alleged violator, the Environmental Protection Agency, and the state in which the alleged violations occur.

The Legal Environmental Assistance Foundation (LEAF), on behalf of its members who are affected by these violations, hereby places you on notice that it believes that the Department of Energy's Y-12 Plant in Oak Ridge, Tennessee, has violated and continues to violate the effluent standards or limitations under the Clean Water Act and the standards and regulations under the Resource Conservation and Recovery Act as specified below. LEAF is aware that DOE has taken the position that some or all of their waste disposal and effluent discharges are exempt from the Clean Water Act and/or RCRA. LEAF believes that this is an erroneous interpretation of these Acts and of the interplay between the Atomic Energy Act and these environmental statutes.

Clean Water Act Violations

1. 33 U.S.C. Section 1311(a), states that the discharge of any pollutant shall be unlawful unless in compliance with Sections 1311, 1312, 1316, 1317, 1328, 1342, and 1344 of the Clean Water Act. Section 1323 makes all of these sections applicable to federal facilites. 40 C.F.R., Part 122, Subpart D, contains requirements for submission of National Pollutant Discharge Elimination (NPDES) Permits which establish effluent standards and limitations for dischargers. DOE has violated and continues to violate Section 1311(a) and the regulations in 40 C.F.R., Part 122, Subpart D, by:

a. Discharging pollutants, including toxic metals and nitric acid, into Bear Creek from the S-3 Ponds, without an NPDES permit.

b. Discharging pollutants, including mercury, into Upper East Fork Poplar Creek from 50-100 discharge points, without NPDES permits.

c. Discharging pollutants, including PCB's and oil, to Bear Creek, from the Burial Ground Pond, without an NPDES permit.

d. Discharging pollutants, including PCB's and perchloroethylene, into Bear Creek from the Oil Land Farm, without an NPDES permit.

2. 33 U.S.C. Section 1342 requires that the effluent limitations of Section 1311 and 1317 be set and enforced through NPDES permits for discharges issued according to 40 C.F.R., Part 122. Your records show that DOE has violated NPDES permit number TN0002968 on numerous occasions. Some of the more recent violations include:

a. March 22, 1983, exceeded zinc limit

b. January 1, 1983, discharge of perchloroethylene, unpermitted

c. September, 1982, exceeded fluoride limit

d. June 10, 1982, dissolved oxygen limit violated

e. June 9, 1982, dissolved oxygen limit and oil and grease limit violated

f. June 8, 1982, dissolved oxygen limit violated

g. October 19 and 20, 1981, exceeded zinc limit

h. March, 1981, exceeded fluoride monthly average

i. March 19, 1980, exceeded suspended solids limit

j. January 3, 1980, exceeded zinc limit

There may be other violations during this time period, however, state records were incomplete.

3. DOE has also violated 33 U.S.C. Section 1342 and 40 C.F.R. Section 122.61 by discharging toxic pollutants from New Hope Pond, such as mercury, without reporting them and including them

in NPDES number TN0002968 permit applications.

RCRA Violations

1. 42 U.S.C. Section 6925(a) prohibits the disposal of any hazardous wastes except in accordance with permits issued pursuant to this section. Section 6961 makes this and other sections of RCRA applicable to federal facilities. LEAF believes that DOE has and continues to violate Section 6925(a) and the regulations implementing it (including, but not limited to 40 C.F.R., Parts 264, 265, and 267) by:

a. Treating, storing, or disposing of hazardous wastes, including metal plating sludges, metal plating solutions, nitric acid, hydrochloric acid, hydrofluoric acid, and halogenated solvents, in unlined surface impoundments (called the S-3 Ponds) without an interim status or final permit.

b. Treating, storing, or disposing of hazardous wastes, including mercury spill material and mercury contaminated sediments, in the Chesnut Ridge Sludge Basin, without an interim status or final permit.

c. Treating, storing, or disposing of hazardous wastes, including halogenated solvents, on the ground at the Oil Land Farm, without an interim status or final permit.

d. Treating, storing, or disposing of hazardous wastes, including halogenated solvents and cyanides, in the ground at the Isolation Area, without an interim status or final permit.

e. Disposing of hazardous wastes, including scrap metals, into two pit areas above the Oil Pond, without an interim status or final permit.

2. 42 U.S.C. 6922 and 40 C.F.R., Part 262 require generators of hazardous wastes to comply with certain notification and record-keeping standards. DOE has and continues to violate these provisions by not complying with any of these standards in regards to the generation of hazardous wastes at the Y-12 facility.

These continued violations of the Clean Water Act and RCRA pose a substantial hazard to the environment and public health in the Oak Ridge area. Contamination of surface waters and groundwater with toxic chemicals as a result of these violations has been widespread by your own records. The DOE, although engaged in national security activities, is not immune from the environmental laws that govern every other industrial facility in this nation. The Memorandum of Understanding signed by DOE, EPA, and the State of Tennessee, on May 26, 1983, regarding the Y-12 facility, does not sufficiently address the violations listed above, since it did not provide that DOE must comply with these environmental laws.

I believe that this notice of intent to file suit sufficiently states the grounds for complaint. If, however, you have any questions or wish to discuss the matter, please contact me.

Sincerely,

Gary A. Davis

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cc: William Ruckelshaus
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Rep. Albert Gore, Jr
1131 Longworth House
Office Bldg.
Washington, D.C. 20515

Rep. Marilyn Lloyd
2334 Rayburn Bldg.
Washington, D.C. 20515

EXECUTIVE ORDER 12088

Federal Compliance with Pollution Control Standards

By the authority vested in me as President by the Constitution and statutes of the United States of America, including Section 22 of the Toxic Substances Control Act (15 U.S.C. 2621), Section 313 of the Federal Water Pollution Control Act, as amended (33 U.S.C. 1323), Section 1447 of the Public Health Service Act, as amended by the Safe Drinking Water Act (42 U.S.C. 300j-6), Section 118 of the Clean Air Act, as amended (42 U.S.C. 7418(b)), Section 4 of the Noise Control Act of 1972 (42 U.S.C. 4903), Section 6001 of the Solid Waste Disposal Act, as amended (42 U.S.C. 6961), and Section 301 of Title 3 of the United States Code, and to ensure Federal compliance with applicable pollution control standards, it is hereby ordered as follows:

1-1. *Applicability of Pollution Control Standards.*

1-101. The head of each Executive agency is responsible for ensuring that all necessary actions are taken for the prevention, control, and abatement of environmental pollution with respect to Federal facilities and activities under the control of the agency.

1-102. The head of each Executive agency is responsible for compliance with applicable pollution control standards, including those established pursuant to, but not limited to, the following:

(a) Toxic Substances Control Act (15 U.S.C. 2601 *et seq.*).

(b) Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 *et seq.*).

(c) Public Health Service Act, as amended by the Safe Drinking Water Act (42 U.S.C. 300f *et seq.*).

(d) Clean Air Act, as amended (42 U.S.C. 7401 *et seq.*).

(e) Noise Control Act of 1972 (42 U.S.C. 4901 *et seq.*).

(f) Solid Waste Disposal Act, as amended (42 U.S.C. 6901 *et seq.*).

(g) Radiation guidance pursuant to Section 274(h) of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2021(h); see also, the Radiation Protection Guidance to Federal Agencies for Diagnostic X Rays approved by the President on January 26, 1978 and published at page 4377 of the FEDERAL REGISTER on February 1, 1978).

(h) Marine Protection, Research, and Sanctuaries Act of 1972, as amended (33 U.S.C. 1401, 1402, 1411-1421, 1441-1444 and 16 U.S.C. 1431-1434).

(i) Federal Insecticide, Fungicide, and Rodenticide Act, as amended (7 U.S.C. 136 *et seq.*).

1-103. "Applicable pollution control standards" means the same substantive, procedural, and other requirements that would apply to a private person.

1-2. *Agency Coordination.*

1-201. Each Executive agency shall cooperate with the Administrator of the Environmental Protection Agency, hereinafter referred to as the Administrator, and State, interstate, and local agencies in the prevention, control, and abatement of environmental pollution.

1-202. Each Executive agency shall consult with the Administrator and with State, interstate, and local agencies concerning the best techniques and methods available for the prevention, control, and abatement of environmental pollution.

1-3. *Technical Advice and Oversight.*

1-301. The Administrator shall provide technical advice and assistance to Executive agencies in order to ensure their cost effective and timely compliance with applicable pollution control standards.

1-302. The Administrator shall conduct such reviews and inspections as may be necessary to monitor compliance with applicable pollution control standards by Federal facilities and activities.

1-4. *Pollution Control Plan.*

1-401. Each Executive agency shall submit to the Director of the Office of Management and Budget, through the Administrator, an annual plan for the control of environmental pollution. The plan shall provide for any necessary improvement in the design, construction, management, operation, and maintenance of Federal facilities and activities, and shall include annual cost estimates. The Administrator shall establish guidelines for developing such plans.

1-402. In preparing its plan, each Executive agency shall ensure that the plan provides for compliance with all applicable pollution control standards.

1-403. The plan shall be submitted in accordance with any other instructions that the Director of the Office of Management and Budget may issue.

1-5. *Funding.*

1-501. The head of each Executive agency shall ensure that sufficient funds for compliance with applicable pollution control standards are requested in the agency budget.

1-502. The head of each Executive agency shall ensure that funds appropriated and apportioned for the prevention, control and abatement of environmental pollution are not used for any other purpose unless permitted by law and specifically approved by the Office of Management and Budget.

1-6. *Compliance With Pollution Controls.*

1-601. Whenever the Administrator or the appropriate State, interstate, or local agency notifies an Executive agency that it is in violation of an applicable pollution control standard (see Section 1-102 of this Order), the Executive agency shall promptly consult with the notifying agency and provide for its approval a plan to achieve and maintain compliance with the applicable pollution control standard. This plan shall include an implementation schedule for coming into compliance as soon as practicable.

1-602. The Administrator shall make every effort to resolve conflicts regarding such violation between Executive agencies and, on request of any party, such conflicts between an Executive agency and a State, interstate, or a local agency. If the Administrator cannot resolve a conflict, the Administrator shall request the Director of the Office of Management and Budget to resolve the conflict.

1-603. The Director of the Office of Management and Budget shall consider unresolved conflicts at the request of the Administrator. The Director shall seek the Administrator's technological judgment and determination with regard to the applicability of statutes and regulations.

1-604. These conflict resolution procedures are in addition to, not in lieu of, other procedures, including sanctions, for the enforcement of applicable pollution control standards.

1-605. Except as expressly provided by a Presidential exemption under this Order, nothing in this Order, nor any action or inaction under this Order, shall be construed to revise or modify any applicable pollution control standard.

1-7. *Limitation on Exemptions.*

1-701. Exemptions from applicable pollution control standards may only be granted under statutes cited in Section 1-102(a) through 1-102(f) if the President makes the required appropriate statutory determination: that such exemption is necessary (a) in the interest of national security, or (b) in the paramount interest of the United States.

1-702. The head of an Executive agency may, from time to time, recommend to the President through the Director of the Office of Management and Budget, that an activity or facility, or uses thereof, be exempt from an applicable pollution control standard.

1-703. The Administrator shall advise the President, through the Director of the Office of Management and Budget, whether he agrees or disagrees with a recommendation for exemption and his reasons therefor.

1-704. The Director of the Office of Management and Budget must advise the President within sixty days of receipt of the Administrator's views.

1-8. *General Provisions.*

1-801. The head of each Executive agency that is responsible for the construction or operation of Federal facilities outside the United States shall ensure that such construction or operation complies with the environmental pollution control standards of general applicability in the host country or jurisdiction.

1-802. Executive Order No. 11752 of December 17, 1973, is revoked.

Jimmy Carter

THE WHITE HOUSE,
October 13, 1978.

Attachment 1

LEGAL ENVIRONMENTAL ASSISTANCE FOUNDATION
CENTRAL APPALACHIAN OFFICE
602 GAY STREET, SUITE 507 • KNOXVILLE, TENNESSEE 37902 • 615-637-5172

TESTIMONY OF THE LEGAL ENVIRONMENTAL ASSISTANCE FOUNDATION BEFORE THE HOUSE SCIENCE AND TECHNOLOGY COMMITTEE, INVESTIGATIONS AND OVERSIGHT AND ENERGY RESEARCH AND PRODUCTION SUBCOMMITTEES

OAK RIDGE, TENNESSEE JULY 6, 1983

INTRODUCTION

The environmental and potential public health problems caused by the Y-12 facility and the issues raised by these problems involve more than just mercury releases that occurred 25 years ago. The cover-up of the extent of the mercury problem, the contamination of the environment with other toxic pollutants, the refusal to comply with state and federal environmental laws, and the question of the independence of assessments of environmental and public health problems all need to be examined in depth by these Committees. The theme running through all these issues is the accountability of the Department of Energy (DOE) for the environmental and public health impacts of its operations.

ENVIRONMENTAL AND PUBLIC HEALTH IMPACTS

Mercury Releases

The main focus of public concern has been the huge mercury releases from the Y-12 Plant that occurred in the mid-1950's and early 1960's. This is understandable, because the release of 2.4 million pounds of mercury is of a magnitude far greater than any other known mercury releases to the environment. The estimated release of 470,000 pounds of mercury into East Fork Poplar Creek compares it with other mercury disasters such as the Minamata incident in Japan. Even without considering pathways of exposure, conversion to methyl mercury, and dose-response relationships, it is important first to acknowledge the magnitude of the disaster.

Secondly, we believe it is imprudent for DOE to make reassuring pronouncements about potential health effects until all the existing data are reviewed by independent sources and further studies are completed. In October, 1982, the State was reassured that there were no potential health effects from the mercury found in fish in East Fork Poplar Creek, because affluent Oak Ridgers don't eat fish from the stream. However, a September 7, 1982 ORNL report had concluded that "human consumption of fish from East Fork Poplar Creek containing more than 1.0 ug/g mercury (the FDA action limit) is likely, although the frequency and quantity of consumption are unknown." The ORNL report also identified other potential pathways of human exposure, such as high levels of mercury in pasture grass in the flood plain of EFPC where cattle grazing is common. We also know from talking to residents of the adjacent Scarborough neighborhood that fishing has been common in the creek over the years.

Another DOE statement involving the potential public health problems from mercury in the creek accompanied their May 17, 1983 release of the 1977 document showing the extent of mercury losses over the years. In a carefully worded statement, DOE "advised ... that the mercury found in recent years in water and in sediment in East Fork Poplar Creek ... pose no hazard to area residents." Perhaps the phrase, "in recent years," was inserted to sidestep data released to the State in December, 1982, which showed that during 1958 the concentration of mercury in the water of EFPC averaged 2.3 mg/l and was as high as 14.5 mg/l. These high concentrations of mercury in the creek coincide with the periods of highest creek losses as reported in the 1977 Mercury Inventory Report. At these high levels of mercury in the water, the concentration of mercury in fish is likely to have greatly exceeded the current FDA Action Level of 1.0 ug/g.

Also, in the press release accompanying the 1977 report, DOE stated that some 1.9 million pounds of mercury that was likely spilled at the plant is safely trapped in geological formations under the plant. Again, these are reassurances with no official basis, for until DOE finds this mercury in the fractured limestone and sinkhole-ridden geological formations underlying the area, it cannot be assumed that this fugitive mercury behaved so nicely.

We are not satisfied so far with efforts by DOE or the state and federal government to identify the potential environmental and public health threats from these mercury releases. The Memorandum of Understanding (MOU) among DOE, the Environmental Protection Agency (EPA), and the State, signed on May 26, 1983, doesn't promise adequate progress or timely answers. The MOU doesn't address mercury in fish and sediments in the Clinch River and Watts Bar Lake, where, after 25 years, most of the mercury is likely to have migrated. The MOU doesn't direct DOE to determine the fate of the 1.9 million pounds of mercury likely to have been spilled onto the ground. And finally, the MOU doesn't provide for an assessment of the health impacts over the years from the presence of mercury in the creek and in the air near Y-12.

Other Pollutants

The discussion today should not be restricted to past mercury releases. The Y-12 plant continues to release mercury and other pollutants into groundwater and surface waters surrounding the plant. These pollutants include plutonium, uranium, thorium, lead, beryllium, nitric acid, hydrofluoric acid, perchloroethylene, and PCB's. The state has documented a long list of inadequacies in DOE water discharge and waste disposal practices. Most of the releases could be avoided if DOE brought waste discharge and disposal practices into compliance with federal and state guidelines.

In addition to water pollution data, the EPA released information in the April 6, 1983 Federal Register that states that the Y-12 plant is the second largest source of airborne radionuclides in the country. According to the EPA, the estimated dose received by the population of Oak Ridge currently exceeds its proposed standards for protection of public health. In light of EPA's information, the air monitoring for mercury should be expanded to include radionuclides from the plant. What this cursory review of environmental problems at the Y-12 Plant reveals is the need for a comprehensive assessment of all impacts of the Y-12 facility.

Recommendations

LEAF makes the following recommendations to this panel and the state and federal agencies participating in this hearing regarding the assessment of environmental and public health problems from the past and present operation of the Y-12 plant:

1. An epidemiological study should be performed by an independent party for the area affected by water and air releases from the Y-12 Plant to detect past health effects from the full range of pollutants released.

2. A health survey should be performed by an independent party on residents of this same area to detect current symptoms of mercury poisoning and abnormal occurrences of other diseases and symptoms.

3. A complete and comprehensive analysis of all of the environmental impacts of the facility should be done by an independent party. This should be done through the National Environmental Policy Act process as a full-blown Environmental Impact Statement prior to the issuance of any new pollution permits for the facility.

THE COVER-UP AND ACCESS TO INFORMATION

DOE has continuously admonished the public that it shouldn't dwell on the past activities and attitudes of DOE and the regulatory agencies responsible for protecting the environment at the facility. However, DOE attempts to cover-up and downplay environmental problems and EPA's laxity in regulating DOE

Environmental activities are impossible to ignore.

Based on recently released records, at least the following is clear:

- DOE knew as early as 1977 that as much as 2.4 million pounds of mercury had been released into the environment at Y-12.
- DOE knew in the 1960's that a number of major spills and leaks of mercury had occurred at the facility and that several hundred thousand pounds of soluble mercury was discharged into the creek.
- DOE was aware of high concentrations of mercury in the sediments of East Fork Poplar Creek as early as 1977, yet it attempted to force TVA to downplay this data by releasing it with mercury contamination data from other areas.
- Although required by law to do so, DOE did not report the mercury releases to the EPA in 1981 under the Superfund notification requirements.
- Although DOE knew that mercury was still being discharged into East Fork of Poplar Creek, mercury was not included as a pollutant in its Clean Water Act discharge permits. The discharge permits also did not include PCB's, another known contaminant.
- The water discharge permits for the Y-12 facility were written by EPA Region IV without mercury limits although Region IV knew that there had been mercury releases from the facility.
- These water discharge permits were written, not at the discharge pipes of the facility (as with every other industrial facility), but downstream at the boundaries of the reservation. They were also written with only concentration limits rather than mass limits for the pollutants specified.
- The Y-12 water permits expired in 1980. EPA Region IV has allowed DOE to continue to operate with these expired permits, even though they were known to be inadequate.
- DOE and EPA Region IV knew as early as 1976 that waste disposal ponds and pits at Y-12 were leaking into groundwaters and surface waters.
- A treatment facility had been designed as early as 1973 to treat wastes being disposed of in these dumps but funding was never requested for the facility until fiscal year

1980-81. No treatment facility has yet been constructed.

- In 1980, with the effective date of federal hazardous waste regulations under RCRA imminent, the DOE decided to claim an exemption from RCRA rather than pay the costs necessary to upgrade leaking waste disposal facilities.

Although the state has not pressed its regulatory authority until recently, this is somewhat understandable in the face of DOE resistance and EPA reticence. The Division of Water Quality should be commended for its currently strong stance.

DOE and EPA officials would now have us believe that those responsible for the current situation have done a sudden about face and now favor full disclosure and full compliance. Current activities speak otherwise. DOE still maintains the RCRA exemption mentioned above and continues to dispose of wastes in an unsound manner. EPA officials have acquiesced in this exemption, and, in 1982, a top EPA official approved a RCRA exemption for an incineration facility in Oak Ridge. EPA headquarters is still considering a draft Memorandum of Understanding proposed by the DOE in September, 1982, that would formalize this exemption.

While DOE's new Oak Ridge manager has pledged an attitude of openness and access to information, DOE headquarters in Washington has proposed broad regulations that will allow DOE to withhold Unclassified Nuclear Information from the public. Under the broad definitions in the regulations, DOE could withhold information on waste disposal, water discharges, and spills from the Y-12 Plant, thwarting the public processes required by most of our environmental statutes and regulations.

Recommendations

LEAF calls for the following actions regarding the cover-up and access to information concerning environmental problems at Y-12:

1. The results of the internal investigation within DOE should be made public and Congress should conduct an independent inquiry into the cover-up.

2. Individuals suspected of being responsible for failing to disclose environmental problems or of ignoring known problems should be immediately relieved of any and all responsibilities for assessing and remedying these problems today.

3. Congress should rewrite the Unclassified Nuclear Information provisions of the Atomic Energy Act to narrow the types of

information that can be withheld, so that information on environmental contamination cannot be considered UCNI.

4. A public interest representative should be included on the Task Force that assesses environmental problems and proposes solutions at the Y-12 facility and should be compensated for his/her time and expenses, in the same way as federal advisory committees.

THE JURISDICTIONAL ISSUE

Since November, 1980, before the Resource Conservation and Recovery Act regulations went into effect to control hazardous waste disposal in this country, DOE has maintained that RCRA contains an exemption for DOE activities. At first, this exemption was expressed in terms of an exemption for chemical wastes mixed with radioactive wastes. Later it became an exemption for all waste-related activities conducted pursuant to the Atomic Energy Act. EPA and the State of Tennessee have acquiesced in DOE's position on this issue and continue to do so.

DOE bases this exemption on the definition of solid waste in RCRA, Section 1004, which explicitly excludes "source, special nuclear, and by-product material" as defined by the AEA, and on Section 1006 of RCRA, which states,

> "Nothing in this Act shall be construed to apply to (or to authorize any state, interstate, or local authority to regulate) any activity or substance which is subject to the ... Atomic Energy Act of 1954, except to the extent that such application (or regulation) is not inconsistent with the requirements of such Acts."(emphasis added)

Please note the last phrase.

Section 6001 of RCRA also addresses the question whether federal facilities must comply with the provisions of RCRA. That section states,

> "Each department, agency, and instrumentality of the executive, legislative, and judicial branches of the federal government (1) having jurisdiction over any solid waste management facility or disposal site, or (2) engages in any activity resulting, or which may result in the disposal or management of solid waste or hazardous waste shall be subject to, and comply with, all Federal, State, interstate, and local requirements, both substantive and procedural ... respecting control and abatement of solid waste or hazardous waste

> disposal in the same manner, and to the same extent as any person is subject to such requirements, including the payment of reasonable service charges."

We concede that, rightly or wrongly, Congress intended to exempt "source, special nuclear, and by-product materials" from RCRA. We do not agree that this exemption is broad enough to include all chemical wastes that are mixed with these radioactive materials. Even this type of limited exemption is especially dangerous in the case of DOE, because the agency is self-regulating in the area of radioactive waste disposal and has consistently ignored sound practices and standards in the disposal of radioactive wastes. Furthermore, would this interpretation allow any waste disposer to escape the provisions of RCRA by procuring by-product material, such as uranium mill tailings, and mixing them with chemical wastes for disposal?

DOE has now gone far beyond this limited exemption in maintaining that all waste disposal activities, even those not dealing with radioactive substances, are exempt from RCRA, because any regulation of an AEA facility under RCRA would be inconsistent with the AEA. This position has no basis in the statutes, case law, or Congressional intent. Sound chemical waste disposal and accountability in the performance of that waste disposal is not inconsistent with the AEA and is thus not exempt from the reach of Section 6001 by the language of Section 1006.

DOE has proposed to become self-regulating under RCRA and has adopted Order Number 5480.2 (December 13, 1982) regarding Hazardous and Radioactive Mixed Waste Management. This order, however, is not even remotely equivalent to RCRA regulations. For example, it provides that:

> "In each area where full compliance cannot be acheived, an exemption may be requested based on the unique characteristics of the sites and/or facilities, or unrealistically high costs compared to the risks involved," and that
>
> "Each operations office's implementing programs may contain alternatives to those articulated in 40 CFR 260-265 (the RCRA regulations)."

In other words self-regulation at DOE facilities will mean business as usual.Some of this business as usual includes:

- disposal of metal plating sludges, metal plating solutions, nitric acid, hydrochloric acid, hydrofluoric acid, and chlorinated solvents into unlined surface impoundments where they leach into groundwater and the headwaters of Bear

Creek.

- disposal of mercury spill material and mercury contaminated sediments into an unlined basin.

- disposal of chlorinated solvents and PCB's onto the ground at the Oil Land Farm without regard for groundwater contamination or evaporation.

- disposal of scrap metals, including radioactive wastes, into pits containing standing groundwater.

These examples are just from Y-12. A similar examination of other DOE facilities will yield a much longer list of activities that would not be permitted under even the weakest interpretation of RCRA standards.

Recommendations

LEAF calls for the following actions regarding DOE compliance with federal environmental laws:

1. DOE should immediately cease hazardous waste disposal operations at Y-12 that are in violation of RCRA standards. This includes the S-3 Ponds, the Chestnut Ridge Sludge Basin, the Oil Land Farm, the Isolation Area, and the disposal pits above the Oil Pond.

2. The EPA should reject DOE's draft MOU for exemption from compliance with RCRA. EPA and the State of Tennessee should require DOE to cease all hazardous waste activities that are not permitted under RCRA, until such time that permits are obtained that comply with RCRA regulations.

3. Congress should amend RCRA clearly to specify that DOE facilities are not exempt from RCRA in their management of hazardous wastes and hazardous wastes mixed with radioactive materials.

4. If not already clear in RCRA, in the Clean Water Act, in the Clean Air Act, and in the National Environmental Policy Act, it should be made abundantly clear that DOE facilities must comply with environmental laws to the same extent as any other industrial facility in this country.

A toxic substance in our water or air is not any less toxic because it came from a DOE facility, and a human life is not any less valuable because it was shortened by exposure to a toxic substance from a DOE facility rather than a private industrial facility. It may require substantial outlays for the Y-12 Plant and other DOE facilities to comply with environmental laws. But private industry is already under an obligation to spend what is necessary to comply with these environmental laws. Rather than lagging behind private industry in compliance with these laws, our government should be setting the example.

Thank you for this opportunity to comment.

Respectfully submitted,

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Mr. GORE. Well, without objection we will hold the hearing record open for some additional documents. We cannot put all documents referred to in the record because there are simply too many of them, but, without objection, the staff will insert such additional documents as they believe might be relevant to the inquiry. We will hold the record open for the submission of other documents by persons who feel they are relevant, and we will consider them for inclusion in the record.

Mrs. LLOYD. I would also like to include in the record the statement of the Department of Energy on DOE's reporting responsibilities under Superfund legislation as well, to present a balance to the position.

[The information follows:]

DOE Position on ~~CERCLA~~ Applicability.
Notification is not appropriate w/ Compliance. —

(235)

[illegible] —
your copy

Department of Energy
Washington, D.C. 20585

FEB 17 1981

MEMORANDUM FOR THOMAS G. FRANGOS
DIRECTOR
OFFICE OF ENVIRONMENTAL COMPLIANCE AND OVERVIEW

FROM: STEPHEN H. GREENLEIGH
ACTING DEPUTY GENERAL COUNSEL FOR PROGRAMS
OFFICE OF GENERAL COUNSEL

SUBJ: DOE REPORTING RESPONSIBILITIES UNDER SUPERFUND LEGISLATION

This memorandum is in response to questions which Ken Johnson of your office has raised regarding DOE's reporting responsibilities under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, P.L. 96-510, commonly known as "Superfund." The questions concern the nature and extent of any reporting requirements to which DOE may be subject under Superfund, and the relationship between Superfund's reporting provisions and DOE's previously enunciated position regarding the inapplicability of EPA's hazardous waste regulations to certain DOE programs.

1. DOE's Obligation to Report Hazardous Substance Facilities

Section 103(c) of Superfund requires that EPA, within 180 days of enactment, be notified of the existence and characteristics of certain sites at which hazardous substances are or have been stored, treated or disposed of. "Hazardous substance" is a term broadly defined in Section 101(14), but the notification requirement under Section 103(c) is limited to sites containing one particular class of hazardous substances, i.e. hazardous waste regulated by the Resource Conservation and Recovery Act (RCRA) (P.L. 94-580), as amended. A further limitation in Section 103(c) excludes from the notification requirements any facility which has been granted a RCRA hazardous waste permit or which has obtained "interim status" under EPA's RCRA regulations. Thus, the only facilities subject to the notification requirement of Section 103(c) are: 1) currently operating hazardous waste management facilities (within the meaning of RCRA) which are out of compliance with EPA's RCRA regulations, and 2) inactive facilities which previously handled RCRA regulated wastes.

as I have already noted, however, RCRA hazardous waste is but one class of the broadly defined term "hazardous substances." It is important to note that should EPA interpret its mandate broadly, it appears that a facility which is required to report under Section 103(c) could be required to report any hazardous substance found at that facility, not just RCRA hazardous waste.1/ Similarly, the requirement in Section 103(a) of Superfund to notify the National Response Center of any release of a hazardous substance into the environment would apply not just to RCRA hazardous waste but to hazardous substances as broadly defined.

2. Applicability of Notification Provisions to Atomic Energy Act (AEA) Program Facilities

The question has arisen whether DOE's hazardous waste management facilities associated with AEA programs need be reported to EPA pursuant to Section 103(c) of Superfund. As you know, DOE has previously taken the position that such facilities are not regulated by RCRA. Because, as discussed above, the applicability of the notification provisions of Section 103(c) is limited to sites containing RCRA regulated hazardous waste, it would appear that information concerning AEA program waste management facilities need not be reported to EPA.

It should be noted, however, that the act of notifying EPA of the existence and characteristics of such facilities need not constitute submission to EPA regulation of those facilities. Notification could be undertaken as a matter of comity, for a useful purpose such as the consolidation of information concerning potentially dangerous former waste disposal areas. Before any decision is taken by DOE not to disclose information concerning AEA program hazardous waste disposal site, the policy implications of such a decision should be carefully evaluated.

It is anticipated that the responsibilities addressed in this memorandum will be clarified as the regulations and guidance implementing Superfund are developed by EPA or other responsible Federal agencies. Further, the conclusions expressed above assume that DOE's position regarding the inapplicability of RCRA to our AEA program wastes is ultimately found to be correct. I will advise you of any further developments which might alter the conclusions stated above.

I would be pleased to discuss these matters with you in more detail should you desire.

1/ Under Section 102(a) of Superfund, EPA has the authority to broaden by regulation the meaning of "hazardous substance" beyond the kinds of substances listed in Section 101(14) of the legislation. Specifically, the Administrator of EPA is authorized to designate as additional hazardous substances "such elements, compounds, mixtures, solutions, and substances which when released into the environment may present substantial danger to the public health, welfare, or the environment...."

cc: Alex Fremling
Ken Johnson

Mr. GORE. I think that is most appropriate, and while we are at it, I would like to also include two chronologies of the events here prepared by the staff of the subcommittee, and without objection that will be done.

Let me thank you, Mr. Rivkin, for your statement and thank all members of this panel for their statements. I have a couple of very brief questions, and then I will call on my colleague and cochairman.

Dr. Gough, you first submitted your proposal for a study on what date?

Dr. GOUGH. No proposal was actually submitted. We did not even get that far. The intent of the sampling was to provide enough data to write a prospectus for the proposal.

Mr. GORE. I see. But on March 27, 1982, you first contacted your immediate superior and referred to a request for an official USGS report on the samples that you and your brother collected. Is that correct?

Dr. GOUGH. The letter was dated on that date; that is correct. That was to enable USGS to officially recognize the sampling.

Mr. GORE. Now you then followed-up that letter with a meeting which took place between you and Mr. Webster Van Winkle. Is that correct?

Dr. GOUGH. There were several meetings during the spring.

Mr. GORE. Well, at some point, Mr. Van Winkle, according to your memoranda and recollection, agreed that the area would be an invaluable study to increase knowledge about contaminant transport. This was on April 13, 1982, according to your notes, but said that there would be a problem in getting such a study approved. Do you remember that?

Dr. GOUGH. Yes.

Mr. GORE. And what was the problem in getting it approved?

Dr. GOUGH. It was indicated to me that there would be bureaucratic sensitivity perceived by Dr. Van Winkle, Dr. Auerbach and others, that would make it impossible to go forward with this.

Mr. GORE. On whose part?

Dr. GOUGH. The fact that—the definition of bureaucratic sensitivity was not given to me, and it was difficult for me to determine who was making that comment. I had the distinct impression that there were individuals far above Dr. Auerbach who were making this kind of classification, and the only names that I know of that were indicated to me were those by Dr. Van Winkle, including individuals such as James White at the Y-12 plant, Dr. Richmond and Jerry Wing at DOE.

Mr. GORE. Now your brother was contacted by Dr. Auerbach—or your brother's supervisor was contacted by Dr. Auerbach?

Dr. GOUGH. That is correct.

Mr. GORE. According to your notes and with the request that the original field notes be returned and that paperwork related to the samples be destroyed and that no written communications pass between USGS and DOE relevant to the matter; is that correct?

Dr. GOUGH. What was requested was that everything be returned from USGS to ORNL, including the samples, themselves, and that it be done without a cover letter.

Mr. **Gore**. Now you subsequently, or rather your brother subsequently turned over all data and notes to Dr. Auerbach, but the USGS made it clear—let me see now—no, you referred in a memo to Mr. Van Winkle that a freeze on data collection had been imposed; is that correct?

Dr. **Gough**. That referred to the information that I received from my brother that Dr. Auerbach had requested that all information be returned from USGS and that further analysis be frozen and at the same time I also was prohibited from doing any further work on the issue.

Mr. **Gore**. All right; now just a short time later, you talked with Jerry Elwood about this matter; is that correct?

Dr. **Gough**. Correct.

Mr. **Gore**. And what was his statement—now Jerry Elwood prepared the 1977 report?

Dr. **Gough**. That is correct.

Mr. **Gore**. And what did he tell you about your efforts to get a study performed?

Dr. **Gough**. Well, he essentially indicated that he wished me luck, but felt that there was virtually no possibility of my getting it through the system because of its bureaucratic sensitivity. He very much supported the effort from a technical standpoint, and he had very much wished to see it done.

Mr. **Gore**. Yes. Well, subsequently you encountered the problem that you referred to with your employment and then decided that it was time to leave—you felt that it was.

I think it is in many ways characteristic of this community, that this problem was uncovered by citizens of this community, because the intellectual ferment, which has always existed here, and the commitment to finding out exactly what the truth is pervades the employees of all the facilities and institutions here and as a result at a facility like this you find folks like Dr. Steven Gough, and there are an awful lot of folks like him in that respect, and so it is not surprising in that sense that people in the Oak Ridge scientific community would sooner or later insist that this matter be fully and completely explored.

Of course, in my opinion, you should not have met with the treatment you received for attempting to get the facts out, Dr. Gough, but I just wanted to run through that chronology briefly.

Now I would like to recognize my cochairman.

Mrs. **Lloyd**. Thank you very much, Mr. Gore.

Mr. Slavin, in your statement you were highly critical of DOE, and I would like to now have you identify the member of the public who has been taken sick by the mercury discharges, or affected in any way.

Mr. **Slavin**. J. C. Wilson, Jr.

Mrs. **Lloyd**. Sir?

Mr. **Slavin**. J. C. Wilson, Jr.

Mrs. **Lloyd**. J. C. Wilson, Jr.?

Mr. **Slavin**. He is a resident from Anderson County, of the community of Beech Grove near Lake City. We have records from Y-12, from Union Carbide Nuclear Division from the 1950's which show that he had mercury in his blood. He has permanent damage to his brain, he has constant vomiting, technicolor hallucinations, loss of vision. He has been diagnosed by Vanderbilt University Hospital as having suspected mercury poisoning, and Union Carbide officials may have perjured themselves in Federal court back in 1972, by saying that this man had never been around mercury.

Mrs. LLOYD. He was employed inside the facility?

Mr. SLAVIN. Yes, ma'am, he was employed inside from 1951 to 19——

Mrs. LLOYD. Well, this has no effect, no bearing on the areas that we are concerned with, the waste disposal problem. He was inside the area.

Mr. SLAVIN. He was inside the area and so were hundreds of other workers, and as Bob Keil from the Atomic Trades and Labor Council will say in a statement I have already read, I will support in full epidemiological studies of all workers who ever worked there. I have heard of suspected cases of people, children who played in the creek, who may have some sort of——

Mrs. LLOYD. Mr. Slavin, what is your scientific background?

Mr. SLAVIN. I have no scientific background as such. If I can go on, there are some other children who allegedly played in that creek and have contracted some illness. But they have not been diagnosed yet—so I do not think we need to go into that at this point.

Mrs. LLOYD. Thank you very much.

Dr. Gough, thank you for your excellent testimony. You mention on page 1 of your testimony that you have research experience in microbiology and toxicology. Have you had any experience in mercury contamination prior to this sampling?

Dr. GOUGH. Yes. I did the environmental assessment for K-25, the aquatic portions. And of necessity, that dealt heavily with mercury contamination and because of course ORGDP is about 14 or so river miles below Y-12. I would point out, too, that during that assessment, I made accepted contacts with individuals on the ORNL staff who are recognized nationally and internationally as mercury experts, such as Dr. Elwood, Dr. Hildebrandt, and so forth, and they both reviewed what I had written and helped in part of the analysis.

Mrs. LLOYD. Were laboratory facilities available to you at the Oak Ridge Complex to accomplish the same function which the USGS laboratory accomplished for you with your brother's help?

Dr. GOUGH. Yes, they were.

Mrs. LLOYD. On page 13 of your testimony, you mention that you thought it was in your prerogative as a research scientist to take the samples and to work in conjunction with your brother at the USGS so that you could prepare recommendations for further research. You also mention that you thought it was expected that you would act in a creative manner to accomplish your job.

Do you know of any other example of research at the lab using USGS laboratory for preliminary work in preparation for doing the work that you did, the research work?

Dr. GOUGH. Anything other than mercury?

Mrs. LLOYD. Yes, sir.

Dr. GOUGH. Well, I could not offhand mention something where work was done in the laboratory at USGS; however, this kind of preproposal work involving individuals outside the complex here is not at all unusual. That was done with the Park Service; it was done with EPA; it was done with a number of different agencies.

Mrs. LLOYD. And I will ask a two-part question for the next question. On page 4, you mention that you thought that the mercury levels were among the highest in the United States, but you also said this may not have any health significance.

Dr. GOUGH. That is correct.

Mrs. LLOYD. And my second point of the question, you mention on page 5, it is difficult to imagine any large-scale remedial measures are either feasible or necessary at this time.

Dr. Gough, do you believe that further investigation on the need for remedial action is necessary before a judgment on remedial action is made, or is there some other conclusion that we should draw at this time?

Dr. GOUGH. I basically made that statement on the basis that further data is required; however, this is purely a subjective judgment at this point, but it seems based on early data that, for example, dredging the creek would create more problems than it would solve.

Mrs. LLOYD. That has been presented as well, has it not, that it would further aggravate the problem to reach the level of mercury contaminants?

Dr. GOUGH. Correct. As indicated before, it may be that the natural processes of burying of the sediments with time may actually create more of a buffer against further pollution, but again in order—as was pointed out—in order to really know, we are looking at 4 to 5 or more years of study. That is really an educated guess.

Mrs. LLOYD. Well, I appreciate your concern and the indepth study that you have gone to to prevent this problem of this magnitude. On page 11 of your testimony, you say there is no reason for extreme reaction. I really take it from that statement—correct me if I am not correct—that you believe there is no present health hazard at the present time from the mercury contamination.

Dr. GOUGH. I would doubt that there is any reason to be in a panic mode at all. I see no reason at all to be other than very concerned, and I think that has been reiterated by a number of individuals on previous panels. I would not categorically state that there are no chronic, long-term health effects that need to be reckoned with, but I merely think that the data do not suggest that we have a Times Beach here or anything approximating it.

Mrs. LLOYD. What is your opinion of the remedial actions that have been proposed at this hearing today?

Dr. GOUGH. Well, like I say, everything that I heard sounds plausible, but in order to make any sort of definitive opinion or statement on that, I would have to have much more detailed information, but it sounds reasonable, the outline of what many people have indicated should be done.

Mrs. LLOYD. Thank you very much.

Mr. Fuzzell and Mr. Weaver, I would like to express my thanks to you for being here and participating in the hearing today, and I say to you the reason I am here and the reason Mr. Gore is here is because of our concern; we want to do what we can to mitigate the concern and move forward in a positive fashion. Thank you for your testimony.

Mr. Rivkin, on page 1 of your testimony you stated that—I referred to this earlier in a question—you stated that DOE refused to comply with State and Federal environmental laws. DOE has stated that they will voluntarily comply with all State and Federal environmental guidelines for the discharge of toxic wastes. On what do you base your allegation that they refused to comply with State and Federal environmental laws? Could you clarify that for the record, please?

Mr. RIVKIN. Other than what I stated in my testimony?

Mrs. LLOYD. That is correct.

Mr. RIVKIN. There is a significant difference that Congress addressed in dealing with the question of Federal facilities between substantive compliance and procedural compliance by Federal facilities. There are Supreme Court cases that led to changes in the relevant acts in 1977. Basically just as TVA, going back on that experience, said they were going to comply substantively with all the requirements, that is simply not enough from a regulatory standpoint. There has to be procedural compliance as well, permits, parameters, enforcement if you will, to insure that compliance actually succeeds. This is necessary in the private sector. I believe it is also necessary in the Federal sector, and I believe Congress agrees with me on that question.

Mrs. LLOYD. I think we have found enough blame that we can easily share; there is certainly enough to go around, Mr. Rivkin.

When you say that DOE cannot be trusted, are you saying that Mr. La Grone cannot be trusted by the people of this area?

Mr. RIVKIN. No, that is why I used that word advisedly; I wanted to make that clear. I have no reason to believe that Mr. La Grone is anything other than a man of full integrity. What I believe, though, is that one individual or even a group of individuals cannot go—cannot correct what I believe is a systemic institutional problem in compliance with environmental laws.

Mrs. LLOYD. What you are saying is we need outside monitoring as well.

Mr. RIVKIN. I believe that there is a very strong necessity for that by the relevant regulatory bodies and also as I indicated by citizens who are not part of that group.

Mrs. LLOYD. Well, Mr. La Grone also stated—I think you agree on this point because he also stated that there is a case for outside review as well.

Mr. RIVKIN. I fully agree with him on that.

Mrs. LLOYD. Thank you very much. Thank you, gentlemen.

Mr. GORE. Thank you all very much for your testimony.

We would like to now call the witnesses on our final panel today. I would like to call the former mayor, Hon. A. K. Bissell; Mr. Benjamin Adams, chairman of the Roane-Anderson Economic Council; Mr. Jeffrey Ginsburg, president of the Oak Ridge Chamber of Commerce; Ms. JoAnne Garrett, chairman of the Committee of Fifty; and Mr. Bob Keil, president of the Atomic Trades and Labor Council.

Ladies and gentlemen, if you would come forward to the witness table. If you would please all stand, in keeping with the precedent we have established in this hearing, and raise your right hand.

[Witnesses sworn.]

Mr. GORE. Thank you very much for being here, and we appreciate your patience in sitting with us through this proceeding.

Madam Chairwoman, I know that these are all close personal friends of yours. May I take the privilege of saying the same, and take particular pleasure in calling upon our first witness, Hon. A. K. Bissell, who has been a friend as long as I can remember having friends, because he knew me before I was born. It is really a pleasure to have you here.

If you want to add to that introduction, you are welcome to do so.

Mrs. LLOYD. It is certainly, I think, a likely panel for "To Tell the Truth." I think we will find them all very formidable panelists. They have certainly added their mark to the advancement of this community, and I am honored to be in your presence. We look forward to hearing your testimony.

Mr. GORE. Batting first is Hon. A. K. Bissell. Without objection, incidentally, as with the previous panels, the full text of your prepared statements will be included in full in the record, and if you wish to summarize any portion of it, please feel free to do so.

Please proceed, Mayor Bissell.

STATEMENT OF A. K. BISSELL, FORMER MAYOR, CITY OF OAK RIDGE, TENN.

Mr. BISSELL. I will summarize briefly, Madam Chairperson, Mr. Chairman, ladies and gentlemen.

As we all know, countless stories have appeared in regional and national media dealing with the mercury problem at the Y-12 plant. I feel it is time to put this issue in the proper perspective. Before doing so, I want to say that my career in Oak Ridge was at the Y-12 plant, and in addition I have had the privilege of serving as mayor of Oak Ridge for 20 years.

My remarks today, ladies and gentlemen, are those of a resident of this city. I am proud of Oak Ridge. I doubt whether you could find a finer place in which to live on this Earth. I am also proud of the fact that Oak Ridge has made many contributions to our Nation's well-being, starting with the work on the atomic bomb, and continuing today in the weapons area and a wide range of activities in science that are highly important to our country.

When we talk about putting the mercury problem in its proper perspective, we have to go back to the 1950's. Our principal concern was maintaining our national defense. It so happens that mercury was important in the development of the Nation's thermonuclear stockpile. This was at a time when the cold war was indeed cold, and we were working on a crash basis, just as we did in World War II in the development of the atomic bomb.

We all know that mercury is toxic, everybody was concerned about it. I am convinced that the Y-12 plant, despite the great rush to have the process onstream, was greatly concerned and took great efforts to help protect the health of the employees.

A second point I would like to make has to do with some stories that have appeared in the newspapers that our mercury problems, particularly the spills, were kept a deep secret. That just isn't true. I have here copies of stories that appeared in April 1966, following the spill of a large amount of mercury at the plant. During that time, the media were not concerned as much about health as they were the fact that the mercury loss was, to quote a Knoxville newspaper, a "$300,000 boo-boo."

A lot has been made of a coverup. The fact remains that the now famous report in which the statement is made that 2.4 million pounds of mercury was lost, or otherwise unaccounted for, was classified national security reasons.

I feel that those who talk about coverup or negligence just plain do not know what they are talking about. As the 1977 report shows, the mercury problem is not new. However, I believe that news stories of the 1960's and reports of the late 1970's have become the media event of the 1980's.

My concern is that of any Oak Ridger who is proud of his community and his contributions to this Nation, no matter how small these may have been. Oak Ridge is a fine place to live; it has a few of the problems which are associated with many communities throughout this State and Nation. In addition, it has performed and continues to perform key missions in relation to the well-being of our Nation. As with any activity, problems are bound to develop. The fact is that our problems have been kept to a minimum, while the contributions of this city and its residents have had immeasurable impact on the well-being of our Nation.

In closing, I want to make five major points:

One, the first is, ladies and gentlemen, damage has been done to the city of Oak Ridge, especially to the self-sufficiency program that is sponsored by DOE.

Two, we must assess the extent of damage and promptly set about a highly visible public program of repair. Citizens, property owners, and developers must have easy access, without DOE redtape, concerning sampling and prompt results.

Three, DOE credibility must be restored. National security, classification, and bureaucratic arguments will not do. All coverup shadow must be removed. We have got to move out of the 1950's and 1960's and into the 1980's and 1990's.

Four, we cannot allow cheap-shot media sensationalism to block progress. We have got to get back to the important work of science, engineering, and technology that we are uniquely qualified for and which this country needs.

Five, and above all, ladies and gentlemen, we must protect the health and welfare of all of our citizens in this very unfortunate situation.

And I would say that the subtle damage, Madam Chairperson, Mr. Chairman, has been done to this community by the adverse publicity would be extremely difficult for me to articulate. It would probably be difficult for anybody to articulate. I am very concerned about it. I am concerned particularly about the growth, planned growth and progress of this marvelous community that I love. I am concerned about those people who are attempting to develop in the west end of this wonderful city, what it will do to them.

Thank you.

[The prepared statement of Mr. A. K. Bissell follows:]

PREPARED STATEMENT OF A. K. BISSELL, OAK RIDGE, TENN.

As we all know, countless stories have appeared in regional and national media dealing with the mercury problem at the Y-12 Plant. I feel it is time to put this issue in the proper perspective. Before doing so, I want to say that as described by the New York Times, I am one of the original "settlers" of Oak Ridge. My career was at the Y-12 Plant. In addition, I have had the privilege of serving as Mayor of Oak Ridge for 20 years.

But my remarks today are those of a resident of this city. I am proud of Oak Ridge. I doubt whether you could find a finer place in which to live. I am also proud of the fact that Oak Ridge has made many contributions to our nation's well-being—starting with the work on the atom bomb, and continuing today in the weapons area and a wide range of activities in science that are highly important to our country. When we talk about putting the mercury problem in its proper perspective, we have to go back to the 1950's. Our principal concern was maintaining our national defense. It so happens that mercury was important in the development of the nation's thermonuclear stockpile. This was at a time when the "Cold War" was indeed cold, and we were working on a crash basis—just as we did in World War II in the development of the atomic bomb.

Our big concern in the 1950's and 1960's was the inhalation of mercury vapor by workers in the process buildings. In fact, during one three-month period, more than 80,000 air samples were taken. In certain operations where the exposure to mercury was greatest, workers had to wear respirators. However, it was recognized that there was a problem and it wasn't until huge ventilation fans were put in place that we felt that air circulation was adequate. Incidentally, I understand that there have been follow-up studies of workers involved in the process over the years, and these studies have shown that no employee had health problems caused by working in the buildings.

We are know that mercury is toxic; everyone was concerned about it. I am convinced that the Y-12 Plant, despite the great rush to have the process on-stream, was highly concerned and took great efforts to help protect the health of the employees.

A second point I would like to make has to do with some stories that have appeared in the newspapers that our mercury problems, particularly the spills, were kept a deep secret. That just isn't true! I have here copies of stories that appeared in April, 1966, following the spill of a large amount of mercury at the plant. During that time, the media were not concerned as much about health as the fact that the mercury loss was, to quote a Knoxville newspaper, a "$300,000 boo-boo."

A lot has been made of a "cover-up." The fact remains that the now-famous report in which the statement is made that 2.4 million pounds of mercury was lost, or otherwise unaccounted for, was classified for national security reasons.

However, what disturbs me more is the idea that no one was interested in what happened to the mercury until 1982. A report was issued by Oak Ridge National Laboratory that is entitled "Mercury Contamination in Poplar Creek and the Clinch River." It is dated June 6, 1977. Granted, this report had limited distribution. However, the following year an environmental report issued by Union Carbide pointed out the higher-than-background mercury concentrations in creek sediments. Incidentally, copies of this report were given to the Associated Press, Clinton Courier-News, Knoxville Journal, Knoxville News Sentinel, The Oak Ridger, Roane County News and United Press International. I have been unable to find any reference to the problem being mentioned in the media at that time.

I feel that those who talk about "cover-up" or negligence just plain don't know what they are talking about. As the 1977 report shows, the mercury problem is not new. However, I believe that news stories of the 1960's and reports of the late 1970's have become the media event of the 1980's.

My concern is that of any Oak Ridger who is proud of his community and his contributions to this nation, no matter how small these may have been. Oak Ridge is a fine place to live; it has few of the problems which are associated with many communities throughout this state and nation. In addition, it has performed and continues to perform key missions in relation to the well-being of our nation. As with any activity, problems are bound to develop. The fact is that our problems have been kept to a minimum, while the contributions of this city and its residents have had immeasurable impact on the well-being of our nation.

In closing, I want to touch on five points:

1. The first is—Damage has been done to the City of Oak Ridge, especially to the Self-Sufficiency Program that is sponsored by DOE.

2. We must assess the extent of damage and promptly set about a highly visible public program of repair. Citizens, property owners, and developers must have easy access, without DOE red tape, concerning sampling and prompt results.

3. DOE creditability must be restored. National security, classification, and bureaucratic arguments won't do. All cover-up shadow must be removed. We have got to move out of the 50's and 60's and into the 80's and 90's.

4. We cannot allow cheap-shot media sensationalism to block progress. We must pay this debt—it's only a small one—and get back to the important work of science, engineering, and technology that we're uniquely qualified for and which the country needs.

5. And, above all we must protect the health and welfare of all of our citizens in this unfortunate situation.

Mr. Gore. Thank you very much for a magnificent statement. Without objection, I think it might be appropriate to include in the record the 1966 newspaper article that you referred to.

Mr. Bissell. I have it attached here, sir.

Mr. Gore. Without objection, that will be included in the record.

Mrs. Lloyd. Mayor, we appreciate your testimony.

[The information follows:]

[From the Oak Ridger, Oak Ridge, Tenn., Apr. 15, 1966]

NEWS ACCOUNTS OF SPILL IN SPRING OF 1966

(Editor's note—Although the Department of Energy only made public last week an extensive report on mercury losses at the Y-12 Plant, this account of a spill in the spring of 1966 appeared in the Friday, April 15, 1966, issue of The Oak Ridger.)

It was revealed today that technicians at the Y-12 Plant here have been busy for the past several weeks—some of them with shovels—trying to dig up $300,000 worth of lost liquid mercury.

The 100,000 pounds of the valuable element leaked from two storage tanks at the Lithium Plant in the Y-12 area during the weekend of March 26-27 and seeped through cracks in the concrete floor into the earth.

According to local Atomic Energy Commission spokesmen, who confirmed the leakage only today after reports about it originated in Washington, the loss happened when someone forgot to turn off a valve.

The local AEC spokesmen said that they made no previous announcement of the incident because there was no hazard involved to personnel at the plant or elsewhere.

First reports of the loss came from the Knoxville News-Sentinel's correspondent in Washington this morning. Inquiries then were confirmed here.

AEC officials explained that the mercury was in two storage tanks and the valve was located in a "site glass"—a small window in the tank which allows technicians to tell the level of mercury in the tanks. The mercury was being used in an isotope separation process.

Officials explained that the "site glass" turned dark and technicians couldn't see the level of the mercury. However, employes devised a solution by putting a piece of plastic tubing to the bottom of the "site glass" and with the aid of a valve were able to allow the mercury to run into the plastic tubing in order to check the level. The plastic tubing was placed in an upright position.

"Someone just simply forgot to turn off the valve and the plastic tubing came loose allowing the mercury to leaked out," the AEC spokesman explained.

Workers have already dug test holes through the concrete floor and found the mercury mixed in with the earth.

"We expect to recover an appreciable amount of the mercury," an AEC statement said. "However, some will be lost because mercury evaporates very quickly," the statement continued.

The AEC said that it will be relatively easy to separate the mercury from the earth through chemical means.

"For $300,000, we can tear up a lot of floor and dig up a lot of dirt," the AEC spokesman added.

AEC officials said they didn't announce the incident when it occurred, "because we feel it was just an operational mishap."

"No one was injured and there was no threat to public health and safety," the official said. "So we didn't feel it necessary to make an official announcement."

However, the missing mercury was reported to the Joint Committee on Atomic Energy in Washington shortly after it was found gone. "We always report operational mishaps to the Joint Committee," the local officials said, "And we did so in this case."

The first word of the missing mercury came from Washington, D.C. in a story written by Powell Lindsey, new Knoxville News-Sentinel correspondent there.

[From the News-Sentinel (Oak Ridge, Tenn.), Apr. 15, 1966]

$300,000 SEEPS AWAY—MERCURY DIG IS ON AFTER Y-12 BOO-BOO

(By Powell Lindsay, News-Sentinel Washington Correspondent)

WASHINGTON.—Oops.

Technicians at the Atomic Energy Commission's Y-12 plant at Oak Ridge are busy—some of them with shovels—trying to dig up a $300,000 boo-boo.

They lost 50,000 pounds of liquid mercury. But they've found it, sort of.

Trouble is, the mercury—valued at $300,000—has seeped through a concrete floor into the earth below.

"But for $300,000, we can tear up a lot of floor and dig up a lot of earth," an AEC spokesman said.

It happened, simply enough, when somebody forgot to turn off a valve. But it all started when a piece of glass tubing turned dark.

SIGHT GLASS TURNED DARK

The tube, called a "sight glass," was used to check to see how much mercury was stored in two large metal storage tanks. Like these seen on big coffee urns in short-order restaurants.

Only this sight glass turned so dark that technicians couldn't see the mercury level. Ever cost-conscious, they devised a remedy.

They attached a piece of plastic tubing to the bottom of the sight glass, and with the aid of a valve, were able to let the mercury run into the plastic tube in order to check the level. The plastic tubing was taped into an upright position.

MERCURY FOUND

This worked fine until the weekend of March 26. When technicians went to work the following Monday, they found the tubing down, the valve open, and the mercury gone.

So now digging operations are under way. A hole was drilled through the concrete floor, and, sure enough, mercury was found in the earth below.

The AEC says that it's not difficult to separate the mercury from the earth; it's just a question of how deep to dig, and over how wide an area, to recover as much of the mercury as is economical.

COMMITTEE INVESTIGATING

"It's a very, very unfortunate industrial error," said an AEC spokesman. He said a five-man committee is investigating the incident and is certain there was no theft involved.

The committee will soon come up with its report on the accident and recommendations to insure against it happening again. Two recommendations come to mind:

1. Replace sight glasses with sight glasses.
2. Teach people to turn off valves.

STATEMENT OF JEFFREY GINSBURG, PRESIDENT, OAK RIDGE CHAMBER OF COMMERCE

Mr. GINSBURG. Thank you. I will give you a joint presentation on behalf of Roane-Anderson Economic Council and the Oak Ridge Chamber of Commerce, because our organizations together represent most of the business and professional people in the Oak Ridge area.

Mr. GORE. Am I correct in understanding that you wish to go just before Mr. Adams, is that correct?

Mr. GINSBURG. Yes.

Mr. GORE. All right, please proceed, and then we will call on Ben Adams.

Mr. GINSBURG. Thank you.

Together our organizations represent most of the business and professional people in the Oak Ridge area and in most other parts of Roane and Anderson Counties. Virtually all of our members live in this immediate area. Few of us have technical training, but we all have a unique and important perspective on this issue.

Our members, as well as nearly all of the residents in the city of Oak Ridge, are vitally concerned about the information that 2.4 million pounds of mercury are unaccounted for from operations at the local Federal plants some 20 to 30 years ago. This is both our home and where we have invested our time, efforts, and money to earn a living and to live with our families.

We do want to know what effect the releases may have had on the health of the people of this area and what effect it may have in the future.

We want to know why the 1977 report was not made public.

We commend Representative Lloyd and Representative Gore for conducting these hearings so promptly. It is an important step in providing necessary information.

We are concerned and we are carefully watching developments, but we are just that—concerned—not in a state of panic or hysteria. Nor are we naive. We have lived here for many years and since the mercury releases, we are aware of no special health problems. Nor have a cross-section of local physicians detected any mercury-related problems, as reported in a story in the Oak Ridger. Studies conducted to date seem to indicate that there is no special health problem and we hope this proves true as further studies are made.

We have been tremendously impressed with the attitude and actions of the Oak Ridge Operations Office of the Department of Energy since the information was released. They have given every indication of concern equal to ours by being open, cooperative with all interested parties, and willing to do anything possible to determine what the effects might be.

While we are disappointed about the lack of earlier information in this issue, a bit of historical perspective must be added to these proceedings. DOE and its predecessors, ERDA and AEC, and their contractors, have been a dominant influence from the beginning. Together they have taken on and successfully completed vital, complex projects involving billions of dollars of public moneys without a hint of fiscal impropriety. In many of those years, they operated under a mandate of secrecy with only Congress providing oversight.

At the time of the major mercury releases, there were different priorities than today when high environmental standards are the rule. Then they were trying to accomplish a project vital to national security with all possible haste and without today's concern for the environment.

Just as we should not judge what was done then by today's standards, neither should we allow the secrecy and security of that era to linger in today's world.

We think it proper and necessary to point out that, no matter the cause, the reason for this hearing again points up the problems which accrue to a community that is essentially a one-company government town. The town was built to serve the three major Federal plants here. Yet, since incorporation in 1959, it has always been the Government's plan to sever the in-lieu-of-tax payments to the community and Roane and Anderson Counties; that they should become self-sufficient. Tremendous local efforts have been maintained to attract new industries, businesses, and residents. Success has been minimal.

We do not wish to dwell on this, but consider please the effects of this mercury issue on efforts to seek the elusive self-sufficiency status the Federal Government imposes on us. One of our biggest assets has been that this area is a particularly fine place to live. Regardless of the facts, that status has changed in the minds of many. Already some of our realtors have reported loss of sales.

Your mandate seems clear. First, to find the facts about any health problems which may exist due to the operations of the plants here. Second, erase the problems that exist, if there are actually any, with a thorough cleanup program.

Third, insure in the future the community will have all facts that might affect living conditions in this area as a result of the operation of the Federal facilities here. And fourth and finally, take a realistic look at the fiscal problems thrust upon the community by Government operations and provide for an adequate and permanent in-lieu-of-tax base.

[The prepared statement of Mr. Ginsburg follows:]

OAK RIDGE
CHAMBER OF COMMERCE
1400 OAK RIDGE TURNPIKE • OAK RIDGE, TENNESSEE 37830 • PHONE 615-483-1321

Presentation for the
Joint Hearing before
the Subcommittee on Energy Research and Production
and
the Subcommittee on Investigations and Oversight
on

"The Impact of Mercury Releases at the Oak Ridge Complex"

Oak Ridge, Tennessee
July 11, 1983
by
Jeffrey Ginsburg, President
Oak Ridge Chamber of Commerce

OAK RIDGE
CHAMBER OF COMMERCE
1400 OAK RIDGE TURNPIKE • OAK RIDGE, TENNESSEE 37830 • PHONE 615-483-1321

Statement from the Oak Ridge Chamber of Commerce

This organization represents most of the business and professional people in Oak Ridge, many of whom have lived in this immediate area for several years. Few of us have technical training, but we have a unique and important perspective on this issue.

Our members --- as well as nearly all of the residents in Oak Ridge --- are vitally concerned about the information that 2.4 million pounds of mercury were unaccounted for during operations at the local federal plants some 20 to 30 years ago.

To add a bit of historical prospective to these proceedings, D.O.E. and its predecessors, E.R.D.A. and A.E.C., and their contractors, have been a dominant influence from the beginning. Together, they have taken on and successfully completed vital, complex projects involving billions of dollars of public monies without a hint of fiscal impropriety.

In many of those years they operated under a mandate of secrecy with only Congress providing oversight. At the time of the major mercury releases there were very different priorities than today when high environmental standards are the rule. Then they were trying to accomplish a project vital to national securitywith all possible haste and without today's concern for the environment.

However, this is both our home and where we have invested our time, efforts, and money to earn a living and live with our families. We do want to know what effect it may have in the future.

We commend Representative Lloyd and Representative Gore for conducting these hearings so promptly. It is an important step in providing necessary information.

We are concerned and we are carefully watching developments, but we are just that - concerned - not in a state of panic or hysteria. Nor are we naive. We have lived here for many years and since the mercury releases, we are aware of no special health problems. Nor have a cross section of local physicians detected any mercury-related problems, as reported in a story in The Oak Ridger. Studies conducted to date seem to indicate that there is no special health problem and we hope this proves true as further studies are made.

We have been pleased with the attitude and the actions of the Oak Ridge Operations Office of the Department of Energy since the information was released. They have given every indication of concern equal to ours by being open, cooperative with all interested parties and willing to do anything possible to determine what the effects might be.

Just as we should not judge what was done 20 to 30 years ago by today's standards, neither should we allow the secrecy and security of that era to linger in today's world.

We think it proper and necessary to point out that, no matter the cause, the reason for this hearing again points up the problems which accrue to the community in what is, essentially, a one-company government town. The town was built to serve the three major federal plants here. Yet, since incorporation in 1959, it has always been the government's plan to sever the in-lieu-of-tax payments to the community and Roane and Anderson Counties: that the community should become "self-sufficient". Tremendous local efforts have been maintained to attract new industries, businesses, residents. Successes have been minimal.

Your mandate seems clear. First, to find the facts about any health problems which may exist due to the operations of the plants here. Second, erase problems that exist, if there actually are any, with a thorough clean-up program. Third, insure that in the future the community will have all facts that might affect living conditions in this area as a result of any operations at the federal facilities here.

Based on our long standing working relationship with D.O.E. and its predecessors, E.R.D.A. and A.E.C., and the available technical expertise in the Oak Ridge facilities, we are confident that this problem can and will be properly addressed.

Mr. GORE. Thank you for a fine, excellent statement.

Next, Ben Adams, who is Chairman of the Roane-Anderson Economic Council. Welcome.

STATEMENT OF BENJAMIN ADAMS, CHAIRMAN, ROANE-ANDERSON ECONOMIC COUNCIL

Mr. ADAMS. Thank you, Mr. Chairman, Madam Chairman.

I would like to very briefly comment upon the joint statement that the Roane-Anderson Economic Council joins with the chamber.

Obviously, the first concern of everyone here is the health and safety, as we say in our statement. Second, we would like to commend very much the city of Oak Ridge's environmental quality advisory board. They have expressed our feelings extremely well and we believe virtually those feelings of all the citizens.

After that, however, I would like to emphasize several issues or several things that have occurred.

Since we started preparation of this joint statement, we have taken the time to read nearly all newspaper reports from surrounding cities, particularly Knoxville, and one each of the newspaper accounts daily in Nashville and Chattanooga. What we read causes us quite a problem. This has been a difficult question to cover. There is confusing technical information that has been made available and people have made assumptions that have been incorrect. There also have been problems caused because public officials have made contradictory and inflammatory statements.

Despite all this, it is difficult and very hard to excuse, one example—and I will cite only one—the Knoxville Journal headlined a major story, "Toxic Mercury Saturated Oak Ridge." In there, they equated elemental mercury with methylmercury and went to some lengths to do it.

This has done us perhaps irreparable harm and it will take longer for these attitudes and these ideas about Oak Ridge to go away than the lingering question of the health hazard. It is not going to do our economics any good and it has us really very much in a bind.

No matter why it happened, no matter who was concerned with it, the genesis of this problem lies with the Federal Government, and it is they who must pick up the responsibility for cleanup regardless of whether they be health-related or economic-related.

Thank you.

[The prepared statement of Mr. Adams follows:]

STATEMENT BY: BEN S. ADAMS, PRESIDENT, ROANE-ANDERSON ECONOMIC COUNCIL

THE FIRST CONCERN OF EVERYBODY WHO LIVES IN OAK RIDGE IS THAT OF HEALTH AND SAFETY, AS WE SAID IN OUR JOINT STATEMENT WITH THE CHAMBER OF COMMERCE. WE WOULD LIKE TO COMMEND AND SECOND THE STATEMENT, ALSO, OF OUR CITY'S ENVIRONMENTAL QUALITY ADVISORY BOARD. THEY HAVE EXPRESSED OUR FEELINGS VERY WELL AND, WE SUSPECT, THOSE OF VIRTUALLY ALL RESIDENTS.

AFTER THAT, HOWEVER, WE WOULD LIKE TO ADD A COMMENT OR TWO ABOUT THE ECONOMIC ASPECTS, OUR PARTICULAR AREA OF INTEREST.

SINCE OUR JOINT STATEMENT WAS PREPARED SOME TWO WEEKS AGO, WE HAVE TAKEN THE TIME TO READ NEARLY ALL REPORTS FROM NEWSPAPERS OUTSIDE OAK RIDGE, ESPECIALLY THE PAPERS IN KNOXVILLE AND ONE PAPER EACH FROM CHATTANOOGA AND NASHVILLE. THE STORY HAS BEEN COVERED EXTENSIVELY. THERE HAVE BEEN NEARLY DAILY REPORTS IN ALL PAPERS. IT HAS BEEN A DIFFICULT STORY TO COVER, FIRST, BECAUSE OF CONFUSING TECHNICAL INFORMATION INVOLVED AND, SECOND, BECAUSE THERE HAVE BEEN CONTRADICTORY AND SOMEWHAT INFLAMMATORY STATEMENTS BY SOME OFFICIALS FROM PUBLIC AGENCIES.

DESPITE ALL OF THAT, IT IS STILL HARD TO EXCUSE, FOR ONE EXAMPLE, THE KNOXVILLE JOURNAL STORY HEADLINED, "TOXIC MERCURY SATURATED OAK RIDGE" WHICK EQUATED ELEMENTAL MERCURY WITH METHYLMERCURY.

THE RESULT OF THIS CANNOT BE HELPFUL TO THE ECONOMICS OF THIS AREA. IT MAY BE VERY HARMFUL. LIKE THE ULTIMATE ANSWER ON THE HEALTH PROBLEMS, WE SIMPLY DO NOT KNOW THE ANSWER YET. IT APPEARS, AT THIS TIME, THAT THE ECONOMIC PROBLEMS MAY BE MORE SERIOUS THAN THE HEALTH PROBLEMS, IF ANY. AND NO MATTER WHY IT HAPPENED, NO MATTER IF NO ONE SHOULD BE BLAMED FOR VERY VALID REASONS, THE GENESIS OF THE PROBLEM DOES LIE WITH THE FEDERAL GOVERNMENT AND THERE MUST BE SOME RESPONSIBILITY FOR THE CLEAN-UP OF THE CONSEQUENCES WHETHER THEY BE HEALTH OR ECONOMIC.

Ben S. Adams, P.E., L.A., R.L.S.
President

EDUCATION: Vanderbilt University
B.S. in Civil Engineering, 1956

LICENSE: Professional Engineer, TN, FL, VA, GA, KY, AL
Registered Landscape Architect, TN
Registered Land Surveyor, TN

PROFESSIONAL AFFILIATIONS: American Society of Civil Engineers
National Society of Professional Engineers
Consulting Engineers of Tennessee, Director
Tennessee Association of Professional Surveyors
American Society of Planning Officials
Tau Beta Pi - Elected to the Society as Eminent Engineer

Mr. Ben Adams is President of ADAMS CRAFT HERZ WALKER of Oak Ridge and Knoxville, Tennessee, the largest Architect/Engineer firm with its principal office in East Tennessee.

The firm of ADAMS CRAFT HERZ WALKER consists of approximately 30 employees in the various professional disciplines required to undertake commercial, industrial, institutional, and environmental projects in both the private and public sector. Mr. Adams has been responsible for direction of all design work and for the corporate planning of the firm, which in the last five years resulted in a four-fold increase in its professional personnel.

Mr. Adams is a past President of the Chamber of Commerce, President of Roane-Anderson Economic Council, member and past President of the Oak Ridge Rotary Club, past Director of the University of Tennessee Arboretum Society, and past Director of the Children's Museum. He was President of the Oak Ridge Arts Council and the President of the Oak Ridge Citizens Committee for the 1982 World's Fair.

Mr. Adams was born in 1933 and educated in Nashville, Tennessee where he attended Montgomery Bell Academy during his high schools years and received a B.S. in Civil Engineering from Vanderbilt University and a commission in the Regular Navy as an Ensign. After serving three years in the Navy, he met and married the former Connie McKay of Oak Ridge, Tennessee. In 1960, he moved to Oak Ridge where he, his wife and daughter, Nancy, reside at 115 Orange Lane. His oldest daughter, Beth, is attending Vanderbilt University. His son, Ben, Jr., is attending Auburn University.

7-11-83

Mr. GORE. Thank you very much. Our final witness—oh, excuse me, we have two more.

Ms. JoAnn Garrett, chairman of the Committee of Fifty. We are delighted to have you here. Please proceed with your statement.

STATEMENT OF JO ANN GARRETT, CHAIRMAN, COMMITTEE OF FIFTY

Ms. GARRETT. Chairman Gore, Chairman Lloyd, the Oak Ridge Committee of Fifty was created earlier this year to promote growth and development in the city of Oak Ridge. While we are deeply concerned about the possible effects of the mercury spills on public health and safety, we recognize that some of the best experts available are currently determining what, if any, dangers are present. We believe that measures under way will bring about a satisfactory resolution of any public safety problems that may in fact actually exist. Our concern is with the detrimental effect on the national public perception of Oak Ridge as a desirable place to live and do business that has been created by the media coverage of our mercury problems. For all the years of our existence, we have suffered from the psychological barriers of secrecy and from the image of a "city that glows in the dark"; this new issue has made our problem worse. The circumstances are worsened by the unfortunate fact that these disclosures have come at a time which, on the basis of other factors, is a rare period of opportunity for our community.

It is our observation that the vast majority of Oak Ridgers do not feel personally threatened by the presence of the mercury. In spite of this, it is clear that the mercury situation has had a negative impact on current residential sales. The major new residential development along the affected creek has had a significant drop in sales which can be matched in time to the beginning of the recent mercury announcements.

The threat of mercury contamination as perceived by non-Oak Ridgers cannot help but have a detrimental effect on their decisions to relocate their businesses and homes in the Oak Ridge area. Thus we fear that the intangible impacts on the health and vitality of our community may outweigh adverse effects of a more concrete form that could result from the mercury contamination or from other chemical or radiological emissions that we may have accrued from DOE activities.

Our committee was born from an increasing awareness that Oak Ridge must take a more aggressive position in determining its future. This could be a period of rare opportunity in Oak Ridge.

DOE is in the process of changing policies and procedures to increase potential economic benefits from its large research and development facilities. We applaud the new liberalization of DOE policies on technology transfer, industrial cooperation, and granting and licensing of patents. We also endorse the self-sufficiency funding concept and the goals to which it is directed. These factors are sure to have a positive influence on our efforts toward growth and development. Additionally the prospect of having a new corporate presence in Oak Ridge as new contractor for the DOE facilities may also offer new opportunity for advancing growth and development here. Thus the problem which is the subject of our discussion here today could not have come at a worse time.

In addressing the mercury spill problem, DOE has been cooperative and has moved swiftly to provide the information and testing required. However, when the State gets involved, things seem to slow down considerably. A means must be found to bring more timely answers from the State of Tennessee.

Oak Ridgers must get an accurate picture of what the mercury threat really is, if there is one. Exact geographical locations where problems exist must be clearly identified. Likewise, those areas that appear threatened and are not must be clearly exonerated. A policy must be established regarding what development is safe, and what earth reconstruction or movement is allowable. That status should then be made known to the general public in terms that are clear to nontechnical people. Most importantly, national media coverage must be presented when the extent of the problem is determined along with the resolution of how the problem is to be solved.

In a much broader context, needed changes should be made in the traditional methods by which DOE and its predecessors have treated the dissemination of information, both technical and nontechnical. Indeed, very recent improvements have already appeared under the new local management. But we must recognize that Oak Ridge institutions and Oak Ridge have historically suffered from information paranoia. Our mysterious, fence-protected origins allowed us to create for ourselves a rarefied atmosphere of self-definition as a special populace. Our institutions, supported by the tradition of secrecy, have been able to get away with the dissemination of predigested information. We have continued to accept the withholding of information which should be openly given. The overall effect of this guarded, frightened, suspicious attitude toward public information adversely influences the image of our community from without and within. The bad news gets out—the good news does not.

Who knows Oak Ridge as the home of an industrial complex with a safety record unmatched by 95 percent of American industry?

Who knows Oak Ridge as the source of energy conservation measures for households and industries now saving citizens of the United States millions of dollars annually?

Who knows Oak Ridge for the millions of heart scans in operation utilizing Oak Ridge—produced thallium isotopes?

Who knows Oak Ridge as the home of the world's most powerful research reactor; now in its 14th year of operation without a single incident?

In all honesty, we probably cannot totally banish the image of "bomb city," but with a little help from the information distributors we could emphasize the fact that we are indeed a mecca for scientists, engineers from all over the world clamoring to meet, to discuss, to learn and to work with us. This information paranoia is treatable and must be cured if we are to downplay our past and proceed with our future unencumbered by wartime baggage. The fences associated with our Department of Energy activities cannot be completely eliminated. However, we would all benefit by having them lowered to the fullest extent possible. We want our community to begin to succeed as a normal city as opposed to a cargo cult whose destiny is totally dependent on outside forces essentially beyond our control.

The Committee of Fifty appreciates the positive way in which the Department of Energy has dealt with the bad news about a problem created in an earlier era and since influence starts at the top, may it be strongly suggested that our legislators can help us to continue to alter our information philosophy. The Department of Energy will hear, our future contractor will listen, and our institutions will respond.

Thank you.

Mr. GORE. Thank you very much for that fine statement. We really appreciate it.

[The prepared statement of Ms. Garrett follows:]

Committee of 50
BIOGRAPHICAL INFORMATION
For Use with News Media

DATE: July 1, 1983

FULL NAME (COMMITTEE MEMBER): Jo Ann Garrett

NAME OR NICKNAME YOU GO BY: Jo Ann

NAME OF SPOUSE: W. R. (Ray) Garrett

HOME ADDRESS: 101 Windham Road

HOME TELEPHONE: (615) 483-4466 WORK TELEPHONE:

Job Title, Address:

Principal Responsibilities of Current Job:

Principal Community Activities (past and present, including offices held and significant awards): Presently Interim Chairman of Oak Ridge Committee of 50. Served on Oak Ridge School Board 1975-1983, V. Chairman 1977-79, Chairman 1979-83. East Tennessee Regional Coordinator of the Tennessee School Boards Association's legislative network. Presently active in Altruse, League of Women Voters. In the past have worked extensively with youth in Scouting (Boy and Girl), Campfire, Oak Ridge Junior Playhouse, Boys' and Girls' Clubs, also served on the Boards of Campfire and Junior Playhouse.

COMMITTEE ON SCIENCE AND TECHNOLOGY

Subcommittee on Energy Research and Production
Subcommittee on Investigation and Oversight

HEARING ON THE IMPACT OF MERCURY RELEASES AT THE OAK RIDGE COMPLEX

Statement from the Committee of 50
by
Ms. Jo Ann Garrett

The Oak Ridge Committee of 50 was created earlier this year to promote growth and development in the city of Oak Ridge. While we are deeply concerned about the possible effects of the mercury spills on public health and safety, we recognize that some of the best experts available are currently determining what, if any, dangers are present. We believe that measures under way will bring about a satisfactory resolution of any public safety problems that may in fact actually exist. Our concern is with the detrimental effect on the national public perception of Oak Ridge as a desirable place of live and do business that has been created by the media coverage of our mercury problems. For all the years of our existence we have suffered from the psychological barriers of secrecy and from the image of a "city that glows in the dark;" this new issue has made our problem worse. The circumstances are worsened by the unfortunate fact that these disclosures have come at a time which, on the basis of other factors, is a rare period of opportunity for the community.

It is our observation that the vast majority of Oak Ridgers do not feel personally threatened by the presence of the mercury. In spite of this, it is clear that the mercury situation has had a negative impact on current residential sales. The major new residential development along the affected creek area has had a significant drop in sales which can be matched in time to the beginning of the recent mercury announcements. This comes at a time when other economic indicators of development in the city are showing marked improvement. A multi-million dollar commercial development has been brought to a standstill awaiting state level results of mercury testing. While other commercial developments along the creek have not yet had a negative impact on their plans resulting from the mercury news, these projects are currently in an earlier planning stage and are not yet affected by lengthy testing schedules.

The greatest impact on our economy will come not from the action of Oak Ridgers but from the action of individuals and firms not presently associated with Oak Ridge. Media coverage on the mercury problem was national and was quite strong. The threat of mercury contamination as perceived by non-Oak Ridgers cannot help but have a detrimental effect on their decisions to relocate their businesses and homes in the Oak Ridge area. Thus we fear that the intangible impacts on the health and vitality of our community may outweigh adverse effects of a more concrete form that could result from the mercury contamination or from other chemical or radiological emissions that we may have accrued from DOE activities in which we as a community have been involved.

Our committee was born from an increasing awareness that Oak Ridge must take a more aggressive position in determining its future. A vital element in that future is a constant progression towards self-sufficiency which can only be brought about by constantly increasing our tax base and thereby decreasing our dependence on direct federal funds. In order to do this we must increase our economic activity and attract new industry and new residents to our city. This task is not an easy one since we must compete with hundreds of other cities where similar economic development efforts are also being aggressively pursued. Yet this could be a period of new opportunity for Oak Ridge. The Department of Energy is in the process of changing policies and procedures to increase the potential economic benefits from its large research and development facilities. We applaud the new liberalization of Department of Energy policies on technology transfer, industrial cooperation, and granting and licensing of patents. We also endorse the self-sufficiency funding concept and the goals to which it is directed. These factors are sure to have a positive influence on our efforts toward growth and development. Additionally, the prospect of having a major new corporate presence in Oak Ridge as new contractor for the Department of Energy facilities may also offer new opportunity for advancing growth and development here. Thus the problem which is the subject of our discussions here today could not have come at a worse time.

In addressing the mercury spill problem, the Department of Energy has been cooperative and has moved swiftly to provide the information and testing required. However, when the state gets involved, things seem to slow down considerably. A means must be found to bring more timely answers from the state. Developers who already have committed funds to a project deserve a rapid assessment of the situation and definition of their limitations and responsibilities regarding the mercury contamination. Long delays at this point will be quite expensive to the developers involved and may well terminate their projects. As mentioned above, one such example already exists.

Oak Ridgers must get an accurate picture of what the mercury threat really is, if there is one. Exact geographical locations where problems exist must be clearly identified. Likewise, those areas that appear threatened and are not must be clearly exonerated. A policy must be established regarding what development is safe, and what earth reconstruction or movement is allowable. That status should then be made known to the general public in terms that are clear to non-technical people. Most importantly, national media coverage must be presented when the extent of the problem is determined along with the resolution of how the problem is to be solved.

In a much broader context, needed changes should be made in the traditional methods by which the Department of Energy and its ERDA and AEC predecessors have treated the dissemination of information, both technical and non-technical. Indeed very recent improvements have already appeared in this sphere under the new local Department of Energy management. But we must recognize that Oak Ridge institutions and Oak Ridge have historically suffered from "information paranoia." Our mysterious, fence protected origins allowed us to create for ourselves a rarefied atmosphere of self definition as a "special" populace. Our institutions, supported by the tradition of secrecy have been able to "get away" with the dissemination of pre-digested information. We have continued to accept the withholding of information which should be openly given. The overall effect of this guarded, frightened, suspicious attitude toward public information adversely influences the image of our community from without and within. The bad news gets out -- the good news does not.

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In all honesty, we probably cannot totally banish the image of "bomb city", but with a little help from the information distributors we could emphasize the fact that we are indeed a "mecca" for scientists and engineers from all over the planet clamoring to meet, to discuss, to learn and to work with us. This "information paranoia" is treatable and must be cured if we are to down play our past and proceed with our future unencumbered by wartime baggage. The "fences" associated with our Department of Energy activities cannot be completely eliminated. However, we would all benefit by having them "lowered" to the fullest extent possible. We want our community to begin to succeed as a normal city as opposed to a "cargo cult" whose destiny is totally dependent on outside forces essentially beyond our control.

The Committee of 50 appreciates the positive way in which the Department of Energy dealt with the "bad news" about a problem created in an earlier era and since influence starts at the top, may it be strongly suggested that our legislators can help us to continue to alter our information philosophy. The Department of Energy will hear, our future contractor will listen, and institutions will respond.

Mr. GORE. The last witness on this panel is Mr. Bob Keil, president of the Atomic Trades and Labor Council. We are happy to have you here. Please proceed.

STATEMENT OF ROBERT G. KEIL, PRESIDENT, ATOMIC TRADES AND LABOR COUNCIL

Mr. KEIL. Thank you, Mr. Chairman, Mrs. Lloyd.

We share the same concerns that the other members of this panel have expressed and realize that the main thrust of this hearing has been on mercury releases. A great deal has been said about environmental impacts and possible health hazards to the community. Certainly we share those concerns.

However, as a labor leader, I think I would be remiss in not taking this opportunity to express the concern over the employees we have who actually handle mercury within the plant.

The Atomic Trades and Labor Council is the recognized union representing approximately 4,600 hourly employees at the Oak Ridge National Laboratory and the Y-12 plant.

My purpose for appearing before this committee is to express our concern over the possible effects of mercury to the employees we represent presently as well as those who have retired.

There were several hundred hourly workers at the Y-12 plant who worked daily with mercury during the early and mid-1950's.

Employees have told me that they worked in areas where mercury was vaporized without respirators or other protective equipment, except for rubber boots and eye goggles. They stated that there were frequent instances when mercury was sprayed onto some employees due to breaks in pipes and other occurrences they termed as "blowups."

Some employees recall that urine samples were taken and some employees were moved to other locations in the plant because of mercury in their urine analysis. Other employees state that they were not required to give urine samples at all and some employees were restricted from working in mercury areas because of known kidney ailments.

Employees remember vividly that they were told by the company to have cavities in their teeth fixed or have them pulled when working in mercury areas to the extent that some were threatened with loss of their job if they did not do so. Just what this indicates I am not sure, although we would assume it was for health reasons.

We believe that a survey should be conducted by an independent group with expertise in mercury exposure to:

1. Identify which present and retired employees worked with mercury.
2. Review these employees' medical records to ascertain if they show mercury exposure and to what degree.
3. Determine what short-term or long-term effects have been, or might be, suffered.
4. Perform any diagnostic tests required.
5. Make known the findings to the employees and the union.
6. Establish protective measures and monitoring for possible future exposure from mercury residue.

I believe that these measures are imperative for the health and safety and economics of our membership.

Thank you.

[The prepared statement of Mr. Keil follows:]

BIOGRAPHICAL DATA

ROBERT G. KEIL

201 DELAWARE AVENUE
OAK RIDGE, TENNESSEE 37830

- PRESIDENT, ATOMIC TRADES AND LABOR COUNCIL
- BOARD TRUSTEE, CENTRAL LABOR UNION
- LT. COLONEL, U. S. ARMY RESERVE
- MEMBER, COMMITTEE OF FIFTY
- OAK RIDGE RESIDENT, 25 YEARS

COMMITTEE ON SCIENCE AND TECHNOLOGY
SUBCOMMITTEE ON ENERGY RESEARCH AND PRODUCTION
SUBCOMMITTEE ON INVESTIGATION AND OVERSIGHT
HEARING ON THE IMPACT OF MERCURY RELEASES AT THE OAK RIDGE COMPLEX

STATEMENT FROM ORGANIZED LABOR

BY

ROBERT G. KEIL, PRESIDENT
ATOMIC TRADES AND LABOR COUNCIL

THE ATOMIC TRADES AND LABOR COUNCIL IS THE RECOGNIZED UNION REPRESENTING APPROXIMATELY 4600 HOURLY EMPLOYEES AT OAK RIDGE NATIONAL LABORATORY AND THE Y-12 PLANT.

MY PURPOSE FOR APPEARING BEFORE THESE SUBCOMMITTEES IS TO EXPRESS OUR CONCERN OVER THE POSSIBLE EFFECTS OF MERCURY TO THE EMPLOYEES WE PRESENTLY REPRESENT AS WELL AS THOSE WHO HAVE RETIRED.

THERE WERE SEVERAL HUNDRED HOURLY WORKERS AT THE Y-12 PLANT WHO WORKED DAILY WITH MERCURY DURING THE EARLY AND MID-FIFTIES.

EMPLOYEES HAVE TOLD ME THAT THEY WORKED IN AREAS WHERE MERCURY WAS VAPORIZED WITHOUT RESPIRATORS, OR ANY OTHER PROTECTIVE EQUIPMENT, EXCEPT FOR RUBBER BOOTS AND EYE GOGGLES. THEY STATED THAT THERE WERE FREQUENT INSTANCES WHEN MERCURY WAS SPRAYED ONTO SOME EMPLOYEES DUE TO BREAKS IN PIPES AND OTHER OCCURRENCES THEY TERMED "BLOW-UPS."

SOME EMPLOYEES RECALL THAT URINE SAMPLES WERE TAKEN AND SOME EMPLOYEES WERE MOVED TO OTHER LOCATIONS IN THE PLANT BECAUSE OF MERCURY IN THEIR URINE ANALYSIS. OTHER EMPLOYEES STATE THEY WERE NOT REQUIRED TO GIVE URINE SAMPLES AT ALL AND SOME EMPLOYEES WERE RESTRICTED FROM WORKING IN MERCURY AREAS BECAUSE OF KNOWN KIDNEY AILMENTS.

EMPLOYEES REMEMBER VIVIDLY THAT THEY WERE TOLD BY THE COMPANY TO HAVE CAVITIES IN THEIR TEETH FIXED OR HAVE THEM PULLED WHEN WORKING IN MERCURY AREAS TO THE EXTENT THAT SOME WERE THREATENED WITH LOSS OF THEIR JOB IF THEY DIDN'T DO SO.

WE BELIEVE THAT A SURVEY SHOULD BE CONDUCTED BY AN INDEPENDENT GROUP WITH EXPERTISE IN MERCURY EXPLOSURE TO:

1. IDENTIFY WHICH PRESENT AND RETIRED EMPLOYEES WORKED WITH MERCURY.

2. REVIEW THESE EMPLOYEES' MEDICAL RECORDS TO ASCERTAIN IF THEY SHOW MERCURY EXPOSURE AND TO WHAT DEGREE.

3. DETERMINE WHAT SHORT TERM OR LONG TERM EFFECTS HAVE BEEN, OR MIGHT BE, SUFFERED.

4. PERFORM ANY DIAGNOSTIC TESTS REQUIRED.

5. MAKE KNOWN THE FINDINGS TO THE EMPLOYEES AND THE UNION.

6. ESTABLISH PROTECTIVE MEASURES AND MONITORING FOR POSSIBLE FUTURE EXPOSURE FROM MERCURY RESIDUE.

I BELIEVE THESE MEASURES ARE IMPERATIVE FOR THE HEALTH AND SAFETY OF OUR MEMBERSHIP.

Mr. **Gore**. Thank you very much. And I might note at this point that the National Institute of Occupational Safety and Health or NIOSH as it is sometimes referred to, will be requested by our two subcommittees to undertake precisely the study which you request in your testimony. I think that is an integral and necessary part of the effort that the entire leadership of this community is involved in now to completely clear the air on all aspects of this problem and put this matter behind us and move forward. And that is really what we hope this hearing will accomplish, to have a full airing—a full and thorough, objective airing of all the facts and assess exactly what needs to be done, elicit commitments from all institutional and individual participants in this whole matter to get moving in the same direction to make certain that this thing is solved in an open way so that everyone knows step by step that it is being completely solved and it is going to be put completely behind this community.

The one thing that I take great satisfaction in is that my knowledge from experience and from history is that Oak Ridge can solve any problem. There is enough talent and commitment here to solve this problem as well, and I am certain that it is going to be done.

Mrs. **Lloyd**. Thank you very much, Mr. Chairman.

I want to also thank you for the very credible and very forthright statements which indicate your concern over the issue at hand and also the appraisal of the issue and the impact of the situation.

Has there been any discussion among Oak Ridge leaders and Roane County on obtaining additional community assistance or funding from DOE to mitigate the economic impacts of this contamination problem? Mr. Adams, would you care to respond?

Mr. **Adams**. Yes, I will respond to that. As far as I know, there has been no formal talks that have been initiated by Government. That could well have been done. Some of the community people have attempted to initiate, at least as late as today, to members of the pilot research group that are working for the Department of Energy. They are in attendance at this particular hearing and are being made—we are making available to them not only the transcripts of what is being said, but our compilation of newspaper stories and asking them to take an extremely close look to an added measure of impact that has occurred since May 18. I suspect that gentlemen at the local level will officially make contact soon to do those things also, if it has not been done.

Mrs. **Lloyd**. Do you have any other comments to add, Mayor Bissell?

[No response.]

Mrs. **Lloyd**. As a Representative from this area for my ninth year, it never ceases to amaze me at the wealth of talent that we have in this area and responsibility that is always present in the citizens of this area. With that wealth of talent and the wealth of concern about the problem at hand, I have no doubt that we will move forward in solving this problem as we have other unsurmountable problems that have appeared so on the horizon, this will also be addressed and resolved.

I would like to echo the sentiments expressed by Congressman Gore that I think we have had an aboveboard, open hearing today;

nothing has been swept under the table or covered up, everything has been brought to light. This has been our motive, to bring everything to light and to look at the impacts of the situation. So you have certainly participated well in this endeavor as well, and I do hope that everyone who attended the session today will be reassured by the experts that have testified that there is no health hazard at the present time from the mercury release and that we will continue to monitor it and provide some warning about potential problems.

Thank you very much.

Mr. GORE. Thank you all very much. We had included in our witness schedule an opportunity for Mr. La Grone to return to the witness table and respond to any concerns that have been raised or make any statement that he would care to about where we go from here.

It has been a fairly full and thorough explication of these matters, and Mr. La Grone, your earlier statement was also pretty full and thorough and we would like to extend the opportunity to you, if you would care to, we would understand if you feel like you do not have too much more to add, then that is fine, too.

We want to give you the opportunity. Of course you are still under oath.

Mr. LA GRONE. Yes, sir.

Mr. GORE. Please proceed with any comments you care to make, Mr. La Grone.

Mr. LA GRONE. Thank you very much, Mr. Gore. My intent is not to rebut or try to debate what has been said here today, but to reflect on this as what I will call a learning and sharing experience.

I have a few brief comments that I would like to impart. In terms of some lessons learned, first of all, the Department of Energy at Oak Ridge Operations Office is not an island unto itself. There are a whole series of interdependencies that involve the DOE, the community, the State, and other Federal agencies. With these interdependencies go certain responsibilities and expectations, a primary one of which is to share information, both the good and the bad.

In one sense, what we have in this instant situation is a violation of the norms and values that we all expect of each other in a free society. Specifically, information that affects us all was not shared when it should have been. Consequently, we have a credibility problem.

A second lesson, the fact that we got where we are because of hot war and cold war circumstances is valid. But it, in and of itself, does not suffice as rationale or justification for how we should conduct our affairs and activities in the 1980's and for the balance of this century.

Third, I am committed to making this memorandum of understanding work, and work not just for the Department but for the city of Oak Ridge and the State of Tennessee, and for the common good and well-being of the citizens of this area. I believe, and I am very confident, that the honest differences and disputes that will arise in the course of the 2 to 3 years of work under the MOU, I believe that those can be resolved in the field, at my level, without having to refer problems to Washington. I believe problems that are worked closest to where they emanate can best be solved. The information sources are better.

As I see the MOU, it along with the other activities we have under way will first of all give us a good diagnosis of the situation. Second, a basis agreement on what is the situation. Third, a means to raise up targets on what we want to accomplish. Fourth, a basis for developing specific proposals to address the problems. And fifth, and perhaps most important of all, a bonding effect on all parties which will produce a high level of trust, respect, and mutual understanding.

As I have approached the situation, I have raised up, and will continue to raise up, some basic questions. First, How is the situation today? Second, How would we like it to be? And third, How do we make it better? With this I couple four basic concepts that are essential to the resolution of problems, not just mercury but all of the environmental problems; these concepts I call the four C's: cooperation, collaboration, communication, and commitment.

Oak Ridge is key to the advancement of ideas and science through the Oak Ridge National Laboratory. Y-12 is a vital component of our national defense complex. Likewise, the diffusion plant is one of our major facilities in providing enrichment services for both domestic and international customers.

I do indeed share the concerns of this committee about having a healthful environment that will provide a solid base for economic growth and development, and it is critical that we get on with the job of diagnosing the problems and setting in motion the solutions.

I, too, have chosen to live in this community with my family to enjoy its benefits and to help provide leadership and an open forum for resolving problems, both the real ones and the perceived ones.

As we go through this process of identifying problems and fixes, I am committed to sharing that information. Likewise, I believe it would be useful to arrange for some outide review of the corrective actions, and to periodically review with the citizens of Oak Ridge just where we are, what are we doing; that is, take a reading on the state of the environmental affairs at Oak Ridge. This process, I believe, will not only provide greater credibility that the right steps have been taken, but also that there will be a broader understanding of where we are and where we are going.

As I reflect on this whole business and as I prepare to close, I am reminded of a poem that I became familiar with a long time ago and that has stuck with me. It is a particular verse from "The Present Crisis" by James Russell Lowell.

> New occasions teach new duties,
> Time makes ancient good uncouth,
> They move upward, still and onward,
> Who would keep abreast of truth.

And truth is what we are talking about, action is what we are talking about. It is indeed, for me, for this Department, for this community, a new occasion, and I believe our duties are abundantly clear.

Thank you.

Mr. GORE. Thank you. That is, to say the least, a most impressive statement, and the reaction of this community to the events which have occurred is also most impressive. I doubt any other community in this country could come together in this fashion and mobilize such an impressive effort to change past practices, to change the circumstances that exist and make it certain that we do it right in the future and move forward quickly.

I cannot say it as eloquently as the poem you quoted, but that is precisely the task that we have before us.

Mrs. LLOYD. We want to thank you, Mr. Gore, for being with us. Thank you, Mr. La Grone, not only for your excellent testimony, but for your concern and your knowledge of the situation and the direction we need to be moving.

I would like to thank you, Mr. Gore, for being with us and spending your time on your Investigations and Oversight Committee to be here today so that we could conduct the hearing that I feel has been very beneficial. I would also like to thank the members of the staff that have been with us, that have worked so very hard in making this a reality, and all the wonderful people that cooperated in such a beautiful manner and also the members of the press that are here today who have done such an effective job of reporting today.

Thank you all.

Mr. GORE. The hearing is adjourned.

[Whereupon, at 4:05 p.m., the subcommittees were adjourned, subject to the call of the Chair.]

APPENDIX A

Documents Pertaining to the Y-12 Environmental Assessment

ENVIRONMENTAL ASSESSMENT

Y-12 PLANT SITE
OAK RIDGE, TENNESSEE

DECEMBER 1982

U.S. DEPARTMENT OF ENERGY
OFFICE OF MILITARY APPLICATION
WASHINGTON, D.C. 20545

SUMMARY

The Oak Ridge Y-12 Plant, operated by Union Carbide Corporation, Nuclear Division, under contract to the U.S. Department of Energy (DOE), has five major responsibilities:

- production of nuclear weapons components
- fabrication support for weapon design agencies
- support for other UCC-ND installations
- support and assistance to other government agencies
- processing of source and special nuclear materials

This Environmental Assessment describes the ongoing operations of Y-12 and evaluates the actual and possible impacts on the environment that continuation of these operations entails. Transportation operations external to the Y-12 Plant are not addressed in this document. Since the plant predates the National Environmental Policy Act of 1969 (NEPA) by over two decades, there previously has been no overall formal retrospective environmental assessment of the whole of its facilities and operations.

Y-12 is located on the DOE Oak Ridge Reservation adjacent to the city of Oak Ridge, Tennessee. The plant and auxiliary facilities occupy 1,384 ha (3,420 acres). It includes approximately 300 buildings plus several disposal sites. These include Rogers and Kerr Hollow Quarries and the sanitary landfill.

Y-12 is located within the Great Valley of the Tennessee River. The plant is situated in Bear Creek Valley at the eastern boundary of the Oak Ridge Reservation. Altitudes range from 226 m (741 ft) to 413 m (1,356 ft) for the subparallel ridges and valleys. Geologic formations are of sedimentary origin. The resultant soils are primarily not suitable for agricultural practice on Y-12 property even though the surrounding region is agrarian in nature. Y-12 is a primary employer in the manufacturing sector of the area.

Y-12 is within the Clinch River drainage system. Two streams are associated with Y-12 operations: the East Fork Poplar Creek and Bear Creek. Each stream has received Y-12 effluent discharges, among others, and has experienced moderate pollution. Accidental discharges of polychlorinated biphenyls (PCB) and mercury have occurred in the past. However, critical concentrations have not been recorded in the water, sediments, or biota. The Plant currently meets National Pollutant Discharge Elimination System (NPDES) permit requirements. No flooding has occurred at the Y-12 Plant.

Humid continental climate characterizes the area with mild winters and hot summers being the norm. Precipitation is evenly distributed throughout the year. Low-level inversions are frequent and fall is usually the season with the greatest number. Because of this air stagnation potential, air pollution is a real concern. Although the Y-12 Plant area meets national ambient standards, sulfur dioxide and particulate emissions have, in the past, exceeded source emission concentrations. Y-12 has rectified the sulfur dioxide problem by switching to low sulfur coal as the primary fuel source at the steam generation plant. Funding has also been approved to provide facilities at the steam generation plant to reduce particulate emissions.

Biota characteristic of the Appalachian oak forest region are abundant. Most frequent dominant tree species include northern red oak, chestnut oak, and yellow poplar. Representative animals include whitetail deer, fox squirrel, pine vole, cotton mouse, and opossum. No threatened or rare plants are known on Y-12 facilities. Although endangered animals exist on the reservation, none have been reported on the Y-12 industrial facilities and, hence, the probability of impact is negligible.

No archaeological sites or historic properties are located on Y-12 lands.

Alternatives considered in this assessment are:

1. No Action - Continued operation of the Y-12 Plant with limitation of adverse impacts by improved pollution control technologies (e.g., waste treatment) as they become available. No plant expansion is scheduled.

2. Discontinue Y-12 Plant operations.

3. Relocate Y-12 Plant operations.

4. Reduce Y-12 Plant operations.

Only the preferred action of continued operation is viable. The other alternatives either only shift environmental impacts to other areas or represent unrealistic solutions.

Impacts from releases of radioactivity to the atmosphere from routine operations were found to be minimal. A small probability exists for accidental releases of radioactivity. A conservative evaluation of an accident involving a fire in a filtering system in a facility processing enriched uranium showed that the release of five kilograms of enriched uranium would expose individuals residing one-half mile north of the plant to 0.02 rem or 13 percent of the exposure to the general public permitted by DOE standards.

Releases of nonradioactive chemicals would have some impacts on the environment. These impacts, however, are not believed to be injurious to the general public. Due to the variety of chemicals used in the plant, several accidental releases were postulated. Atmospheric releases involving a fire in a building which contains significant quantities of mercury and a release of hydrogen fluoride as the result of a cylinder valve breakage were evaluated. In both cases, concentrations of these materials were calculated at the closest residences which exceeded exposure standards but were below levels considered by OSHA to be immediately hazardous to life and health. An accident involving spillage of acid during a transfer operation was found to do temporary damage to the ecosystem in the stream draining the plant area.

Impacts from the continued operations are minimal or negligible for land use, meteorology (air quality), biology, hydrology, and archaeology. Y-12 is an integral contributor to Oak Ridge's economy and any change will have a profound effect on the community. The only major area of environmental concern involves particulate emissions from the Y-12 steam generation plant. Therefore, funding has been approved for the installation of pollution abatement equipment, i.e., baghouses, be installed to reduce particulate emissions. Despite current compliance with permits, regulations, and standards for effluent and surface stream water quality, improved environmental control is recommended for surface water discharge, wastewater treatment, PCB disposal, and coal storage. Some of these improvements are currently under consideration or are being implemented.

Due to unforeseen delays in the completion of this report, much of the data presented is several years old. However, since conditions in the Oak Ridge area and the Y-12 Plant have not changed significantly in this period, the data presented is typical of present conditions.

I
PURPOSE AND NEED FOR THE PROPOSED ACTION

The Oak Ridge Y-12 Plant is one of the U.S. Department of Energy's major installations in Oak Ridge, Tennessee. The facility, which is operated by Union Carbide Corporation, Nuclear Division, Oak Ridge, is basically a production facility for nuclear weapons components; however, a portion of the total facility is used by the Oak Ridge National Laboratory for execution of physical and biological research.

Major activities at Y-12 include chemical processing of lithium and uranium compounds, precision fabrication of components from lithium, uranium, and many other materials, and the assembly of these components into major subassemblies for nuclear weapons. ORNL research activities at Y-12 include fusion, fission reactor development and safety, and biological studies on the impact of radiation on living organisms.

Y-12 is located in Oak Ridge, Tennessee (Figure I-1). The Y-12 Plant site (Figure I-2) contains a total of 1,384 ha (3,420 acres) consisting of an inner industrial plant complex covering 243 ha (600 acres) surrounded by a required buffer area of approximately 1,141 ha (2,820 acres). The industrial plant complex is roughly divided into two portions, the western portion being devoted to DOE ongoing weapons-manufacturing activities and the eastern portion being devoted to DOE-Oak Ridge National Laboratory (ORNL) primary research programs in biology, reactor, controlled thermonuclear, and stable isotope separation activities. The plant facilities include 261 buildings, including large machine shops, chemical processing buildings, laboratories, maintenance buildings, change houses, and numerous plant support facilities. Within the surrounding buffer area and outside the main industrial complex, approximately 2.2 ha (5.5 acres) are allocated to a retention pond for fly ash and bottom ash pumped through a pipeline from the Y-12 steam plant. A fenced area is located on Bethel Valley Road immediately south of the plant containing approximately 12 ha (30 acres) surrounding a former quarry (Bethel Valley Quarry) which was formerly used as a disposal site for non-radioactive obsolete classified tools and equipment; it is now used as an overflow and dilution basin receiving the outflow from the Y-12 ash-retention pond. Approximately 51 ha (125 acres) are allotted for a sanitary water-treatment plant which serves the Y-12 Plant, the ORNL, and the City of Oak Ridge. This treatment facility is operated by another DOE prime contractor, Rust Engineering Company. Portions of the buffer area also are used for other DOE programs administered by ORNL involving approximately 567 ha (1,400 acres) for environmental research and forestry management and for programs administered by the Comparative Animal Research Laboratory (CARL) involving approximately 243 ha (600 acres). Approximately 5 km (3 mi) of the extreme eastern end of Bear Creek Road on the north side of the industrial complex also passes through the buffer area. Plant support areas outside the buffer area (Figure I-2) include approximately 61 ha (150 acres) for a sanitary waste landfill used to dispose of solid wastes from the Y-12 Plant, ORNL, and Oak Ridge Gaseous Diffusion Plant (ORGDP); approximately 26 ha (65 acres) located west of the main plant used as a burial ground for low level radioactively contaminated solid wastes generated in Y-12 Plant operations;

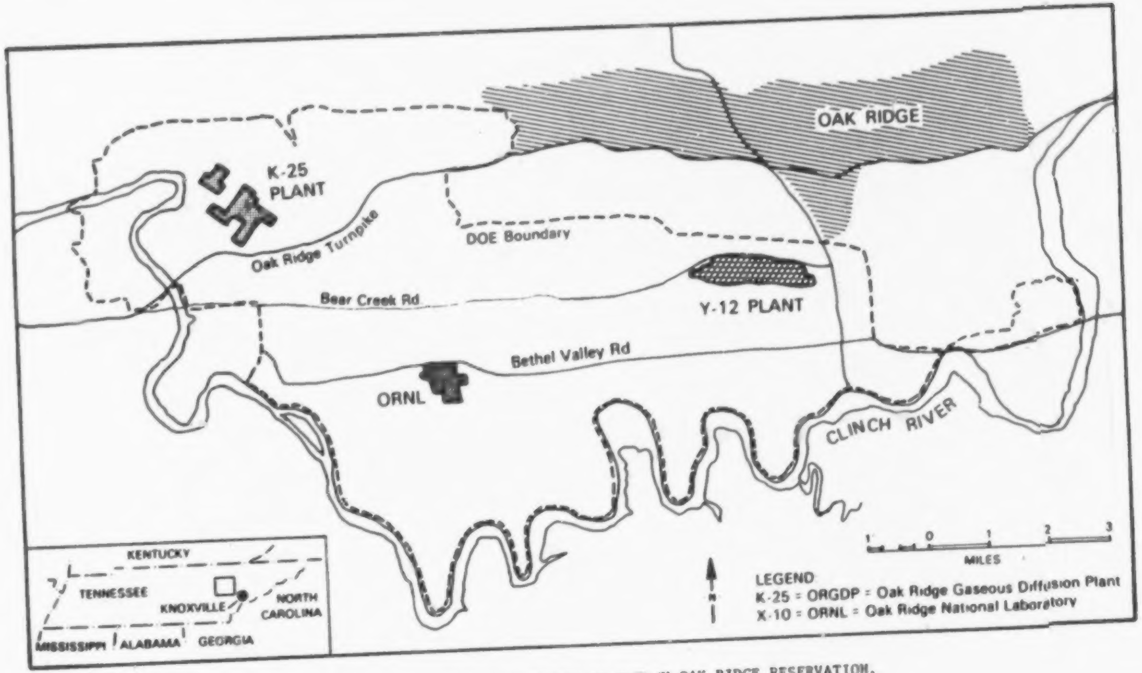
OAK RIDGE
K-25 PLANT
Oak Ridge Turnpike
DOE Boundary
Bear Creek Rd
Y-12 PLANT
Bethel Valley Rd
ORNL
CLINCH RIVER
1 0 1 2 3
MILES
N
LEGEND
K-25 = ORGDP = Oak Ridge Gaseous Diffusion Plant
X-10 = ORNL = Oak Ridge National Laboratory
KENTUCKY
TENNESSEE
KNOXVILLE
NORTH CAROLINA
MISSISSIPPI
ALABAMA
GEORGIA

FIGURE I-1. U.S. DEPARTMENT OF ENERGY OAK RIDGE RESERVATION, SHOWING THE THREE PLANTS (K-25, X-10, Y-12) AND THE CITY OF OAK RIDGE

Source: Alexander, 1979.

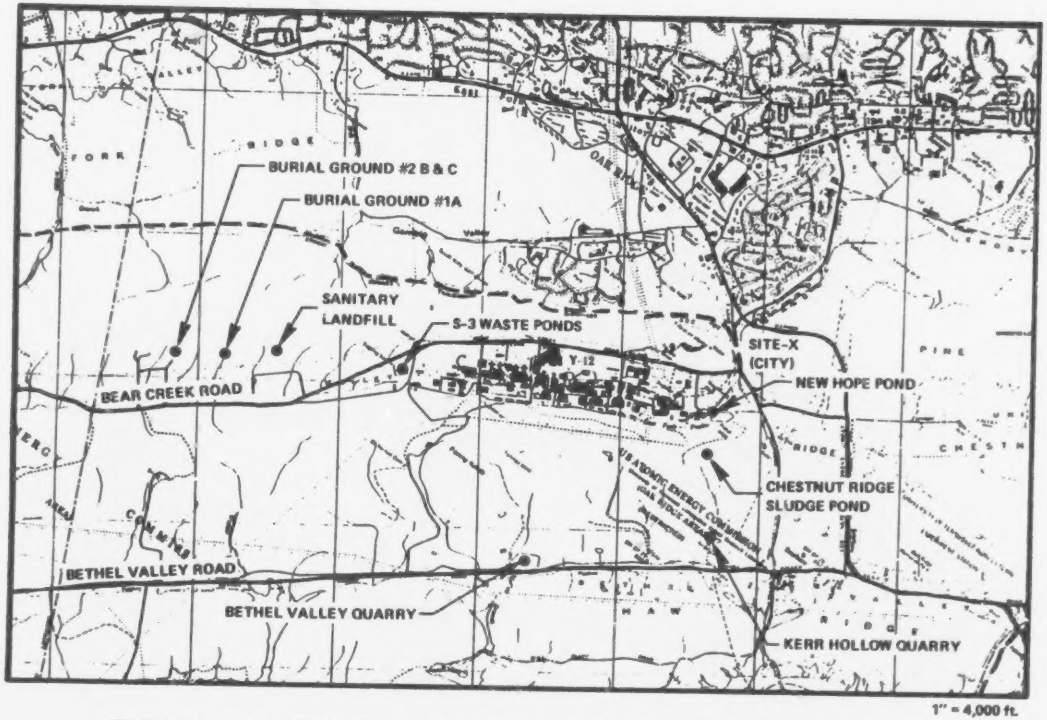
BURIAL GROUND #2 B & C
BURIAL GROUND #1A
SANITARY LANDFILL
S-3 WASTE PONDS
Y-12
SITE-X (CITY)
NEW HOPE POND
CHESTNUT RIDGE SLUDGE POND
BEAR CREEK ROAD
BETHEL VALLEY ROAD
BETHEL VALLEY QUARRY
KERR HOLLOW QUARRY
OAK RIDGE
1" = 4,000 ft.

FIGURE I-2. WASTE MANAGEMENT AREAS WITHIN THE OAK RIDGE NATIONAL RESERVATION

Source: Oak Ridge Operations, 1975.

an approximately 1.6-ha (4-acre) site, Kerr Hollow Quarry, comprising an abandoned quarry filled with water located north of Bethel Valley Road and approximately 610 m (2,000 ft) west of the intersection of Bethel Valley and Scarboro Roads which was formerly used as a disposal and dilution basin for selected non-radioactive chemical wastes, primarily sodium, lithium, and potassium, obtained from Y-12 Plant operations; and a .4-ha (1-acre) site located on the north bank of Melton Hill Lake at Clinch River, Kilometer 66.8 (Mile 41.5), for a pumping station which supplies raw water to the Y-12 Plant and the Oak Ridge water plant.

The proposed action is actually a no action alternative because it calls for the continued operation of the existing Y-12 facility. This action is essential to the maintenance of the United States' national defense program. Also, essential research and development activities are conducted in nuclear energy and alternative energy sources. Radiation risk to man is another principal research area. Other benefits for the Y-12 operations include machining capabilities which have become a resource for other government agencies and technology spinoffs to industry of non-classified items under DOE patents. In addition, unclassified information is made available to the interested public.

Literature Cited

Alexander, J. K. 1979. Background environmental information--Y-12 Plant. Report No. ORO-771. U.S. Department of Energy, Oak Ridge, TN.

Oak Ridge Operations. 1975. Oak Ridge Land Use Plan. Report No. ORO-748. U.S. Energy Research and Development Administration, Technical Information Center, P.O. Box 62, Oak Ridge, Tennessee.

uranium and other radioactive materials. Nonradioactive wastes and potential pollutants are generated from support operations such as:

- acid disposal
- air conditioning
- cooling towers
- steam plant operations
- water demineralizers.

A schematic diagram of the effluents, emissions, and wastes produced at the Y-12 Plant is shown in Figure II-2. This diagram includes the types of wastes and potential pollutants, their disposal sites, and points of entry into the various environmental media.

As shown in Figure II-2, nonradioactive solid wastes are buried in a centralized sanitary landfill or designated burial areas. Radioactive solid wastes are buried in designated burial areas or placed in retrievable storage either above or below ground, depending upon the type and quantity of radioactive material present and the economic value involved.

Gaseous wastes usually are treated by filtration, electrostatic precipitation, and/or chemical scrubbing before release to the atmosphere. The major gaseous waste streams are released through stacks to provide atmospheric dilution for pollutants which are not removed during treatment.

Process water which may contain small quantities of radioactive or chemical pollutants is discharged, after treatment, to East Fork Poplar Creek, a small tributary of the Clinch River.

Burial grounds and holding ponds serve as repositories and treatment basins for the solid and liquid wastes generated by various activities of the Y-12 Plant. However, while great care is taken to remove and/or contain harmful pollutants, there are low levels of both radioactive and nonradioactive releases to the air and water media which are below established limits and/or guidelines. To date these releases have not caused any apparent significant impacts to the environment.

Air emissions include flue gases from the steam plant, process gases, low level radioactive particulates, fugitive dust (e.g., coal storage pile), and volatile organic materials from the burial grounds, treatment and storage basins, and sanitary landfills. Estimated amounts of gaseous emissions from Y-12 are presented in Table II-1.

Point and non-point liquid effluents from the Y-12 Plant area include those from New Hope Pond, Bethel Valley and Kerr Hollow Quarries, runoff from the coal storage pile, potential leachate from the sanitary landfill, as well as runoff, leachates, and seepage of liquids stored in the burial grounds. Provisions have been made or are being made for the containment and treatment or removal of some of the runoff and seepage.

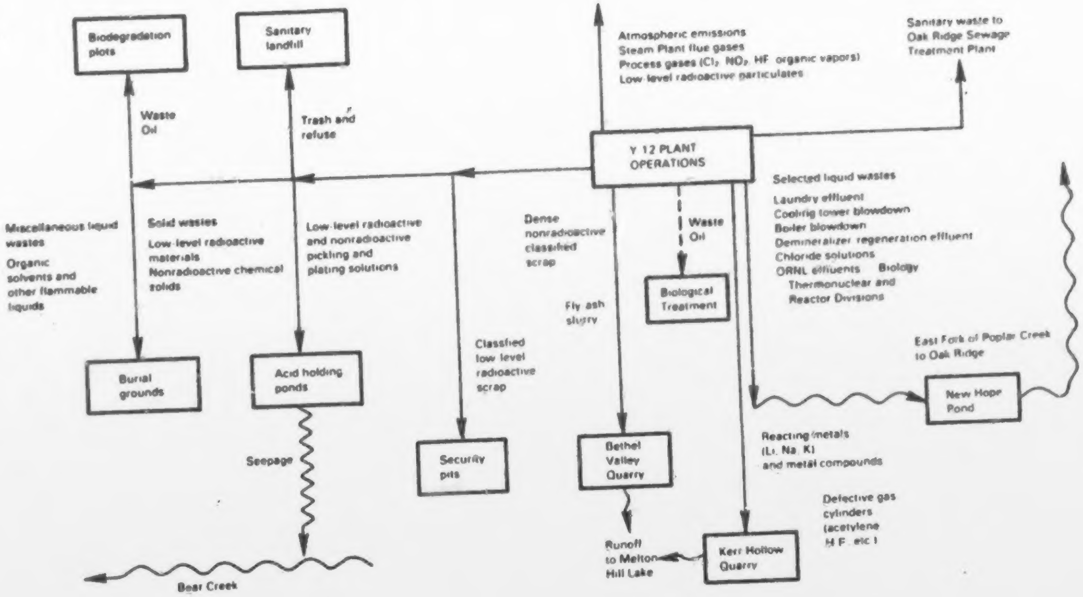
Biodegradation plots
Sanitary landfill
Atmospheric emissions
Steam Plant flue gases
Process gases (Cl₂, NO₂, HF, organic vapors)
Low level radioactive particulates
Sanitary waste to Oak Ridge Sewage Treatment Plant
Waste Oil
Trash and refuse
Y 12 PLANT OPERATIONS
Selected liquid wastes
Laundry effluent
Cooling tower blowdown
Boiler blowdown
Demineralizer regeneration effluent
Chloride solutions
ORNL effluents Biology
Thermonuclear and
Reactor Divisions
Miscellaneous liquid wastes
Organic solvents and other flammable liquids
Solid wastes
Low level radioactive materials
Nonradioactive chemical solids
Low level radioactive and nonradioactive pickling and plating solutions
Dense nonradioactive classified scrap
Waste Oil
Biological Treatment
Fly ash slurry
Classified low level radioactive scrap
East Fork of Poplar Creek to Oak Ridge
Burial grounds
Acid holding ponds
New Hope Pond
Seepage
Security pits
Bethel Valley Quarry
Reacting metals (Li, Na, K) and metal compounds
Defective gas cylinders (acetylene H F, etc.)
Runoff to Melton Hill Lake
Kerr Hollow Quarry
Bear Creek

FIGURE II-2. SCHEMATIC OF EMISSIONS, EFFLUENTS, AND WASTES FROM THE Y-12 PLANT

Information on air, water, effluent, and environmental quality for DOE's Oak Ridge complex is contained in the 1978 Annual Environmental Monitoring Report (Union Carbide, 1979b). Because of the importance of this information, an excerpt from the report summary is reproduced herein:

> "Surveillance of radioactivity in the Oak Ridge environs indicates that atmospheric concentrations of radioactivity were not significantly different from other areas in East Tennessee. Concentrations of radioactivity in the Clinch River and in fish collected from the river were less than 3 percent of the permissible concentration and intake guides for individuals in the offsite environment. While some radioactivity was released to the environment from plant operations, the concentrations in all of the media sampled were well below established standards...
>
> "The average total body dose to an Oak Ridge resident was estimated to be 0.05 millirem/yr as compared to approximately 100 mrem/yr from natural background radiation; the average dose commitment to the lung of an Oak Ridge resident was 0.17 millirem. The cumulative total body dose to the population within an 80-kilometer radius of the Oak Ridge facilities resulting from 1978 effluents was calculated to be 5.6 man-rem. This dose may be compared to an estimated 74,000 man-rem to the same population resulting from natural background radiation.
>
> "The chemical water quality data in surface streams obtained from the water sampling program indicated that average concentrations resulting from plant effluents were in compliance with State stream guidelines with the exception of fluorides which were slightly over the limit."

The discharge of surface water includes general runoff from the Y-12 Plant area proper, from the burial grounds, and from the sanitary landfill. One of the current concerns is the runoff of water which originates as rain and percolates through the coal stored in a pile near the steam plant. The leachate from the coal pile is contaminated with both natural occurring inorganic and organic materials.

Another area of environmental concern is the emissions from the coal-fired steam generation plant. Its purpose is to provide steam for process use and for heating. The facility consists of four Wickes Boiler Company boilers of the two-drum bent-tube design. Each unit is capable of 113,000 kg/hr (250,000-lb/hr) steam generation at 17.6 kg/cm^2 (250 psig) and 260 C (500 F). Loads vary from less than 90,600 kg/hr (200,000 lb/hr) in summer to peaks of more than 272,000 kg/hr (600,000 lb/hr) in winter; average winter and summer loads are 204,000 kg/hr (450,000 lb/hr) and 90,600 kg/hr (200,000 lb/hr), respectively. Average annual coal usages are 77,000 metric tons (85,000 tons).

Electrostatic precipitators were installed in 1968 to remove particulates from the flue gases. The precipitators are one-chamber one-field units designed for 2860 m^3/min (101,000 abs cfm) at 143 C (290 F) with a tested collection efficiency of 98 percent or 0.16 Kg (0.35 lb) per million Btu of heat input for particulate emission. However, these units experienced overloading when the boilers were run at or near maximum (Table II-2). Consequently, the flue gas pollutants do not meet current emission standards (Table II-2). Sulfur dioxide emissions have recently been reduced by purchasing only low sulfur coal and blending it with the remaining high sulfur coal in proportions to yield emissions below the allowable standard. Unfortunately, the particulate emissions are still in noncompliance with emission standards.

Although Y-12 presently is experiencing particulate emission problems as well as other minor environmental problems, the benefits derived from the plant far exceed any losses imposed by these additional environmental burdens. In addition, steps are being taken to mitigate these problems (see Section II.A.5.). Oak Ridge is an integral part part of the nation's defense program. It produces components for both nuclear and thermonuclear weapons as well as lends fabrication support to weapons design laboratories. Research and development activities are conducted that cover both nuclear and alternative energy sources and involve almost every facet of modern technology. One of the most significant areas of contributions being made to national needs is that of energy research and development. These ongoing tasks are of prime importance for the national goal of achieving inexpensive and reliable sources of energy while decreasing U.S. reliance on foreign energy supplies.

A principal ORNL research effort at Y-12 is the estimation of risk to man from radiation. Such estimation is made by utilizing limited human exposure data and extrapolating experimental animal data to man. By interspecies comparison of radiation exposure in animals in Oak Ridge research projects, better predictions hopefully can be made.

II.A.2 Discontinue Operations

Part of DOE's current Congressionally-mandated mission is to support the national policy of maintaining an improved nuclear weapons stockpile. The Y-12 Plant is important to the fulfillment of that policy. Closing the Y-12 Plant would be detrimental to DOE's overall mission, would have a negative impact on the economy of the area, and would have only limited net impact on the environment. Specifically, utilities and resource consumption would be discontinued and emission of air pollutants and discharge of wastewaters would be significantly reduced but not eliminated. There would be a negative impact caused by the loss of jobs and salaries.

Operational accident threats which have a potential environmental impact would be eliminated by a shutdown, but other operations at the Federal complex would continue to have their impact on the local environment. Should the entire complex be vacated, it still is unlikely that the land could be returned to its original environmental state. The location and the industrial zoning of the land make it a likely candidate for continued industrial use.

Another effective means of control is the minimization of discharge of hazardous materials with the wastewater by good housekeeping practices and by more vigorous control of the processes involved.

Presently, a central pollution control facility (CPCF) is being designed to treat liquid wastes from the Oak Ridge Y-12 Plant and construction funds will be requested.

Several sources of liquid pollutants have been identified for treatment on the basis of meeting the interim best available treatment economically achievable (BATEA) objectives of the Clean Water Act of 1977. The general categories of waste to be processes are:

- caustic and acidic wastes (heavy metals, acids, bases, nitrates, fluorides, cyanides, etc.);
- plating shop floor wastes (dilute caustic and acidic wastes); and
- contaminated waste water (low concentration of suspended uranium and beryllium metal particles).

These categories of waste represent a wide range of chemical compositions and concentrations. Generally, all the pollutants are inorganic chemicals. Organic pollutants are not expected to exceed trace concentration levels.

The principal treatment to be applied to the above mentioned aqueous waste categories is neutralization and solids removal. However, some of the chemical waste will undergo pretreatment before neutralization. For example, chromates will require pretreatment with ferrous sulfate to reduce Cr^{+6} to Cr^{+3} before neutralization. Also, cyanides must be destroyed.

The neutralization will precipitate heavy metals so that they can be removed by settling, filtration, etc. Neutralization also will eliminate excess hydrogen or hydroxyl ion concentrations (pH adjustment to 6.5 - 8.5). For heavy metals, the pH of waste should be adjusted between 7.5 and 10.5 in order to obtain precipitation under conditions of maximum insolubility.

Sludges from neutralized waste filtrate will be packaged and sealed in 55-gallon plastic drums for disposal in an appropriate landfill. Neutralized nitrate filtrate will be transferred to the existing denitrification facility for destruction. All other neutralized waste filtrates, including soluble salts of calcium and sodium, will be discharged to the East Fork of Poplar Creek. The dissolved solids of the stream are not expected to increase by more than 25 ppm (UCC-ND Engineering, 1978) and should not cause significant additional degradation of the quality of the stream.

Engineering and design activities have begun for this facility. It is anticipated that construction will begin in FY 1982 and that the facility will be in operation in FY 1984.

The Y-12 Plant at Oak Ridge plays a significant role in the socioeconomic activities of the City of Oak Ridge as well as neighboring communities. It is not only the direct effects of employment and earnings that need to be examined but also the indirect effects through the multipliers that make themselves felt on other industries, such as sales, services, retail and wholesale trades, as well as financial institutions.

Should there be a major change in policy and the activities of the Y-12 Plant are altered from that of the status quo, it is important to note that the socioeconomic activity of the communities under consideration will be greatly affected. The direction and magnitude of change or impact are dependent upon the scenario for the proposed future action.

IV.A.1.c Geological Impacts. No changes to the integrity of the geological substratum have been detected during the operation of Y-12. Consequently, no impacts are anticipated from continued operations. Seismically, the area is stable and damage from earthquakes is considered negligible.

Since no expansion is projected, no prime/unique farmland soils will be impacted.

Stream sediments are of concern because of toxic substance contamination. These sediments may be removed for decontamination or left *in situ*. Because known concentrations of PCB and mercury are below the recommended standards for deposit removal (total mercury, 25 mg/kg; PCB, 10 mg/kg; Murakami and Takeishi, 1977), it seems that these stream sediments may be left intact without hazard to the surrounding environs.

IV.A.1.d Hydrological Impacts. The quality of the water in Bear Creek and East Fork Poplar Creek from Y-12 operations should improve in coming years due to projects which are in progress or which are proposed. The line-item project, Control of Effluents and Pollutants, Y-12 (81-D-120) provides for the neutralization, precipitation, settling, and filtration of aqueous waste streams generated in the Y-12 Plant in the course of normal operations.

This project will improve water quality in the creeks although the discharges to these creeks currently meet NPDES permit levels.

A second project has been proposed to further improve the water quality of the two creeks. The project would provide a system for treating the runoff from the coal pile and some other aqueous streams. Also included in this project are systems to handle various sludges generated while treating aqueous streams, the disposal of hazardous materials, and purification of contaminated oils.

The City of Oak Ridge is also in the process of constructing a new sewage treatment plant on East Fork Poplar Creek downstream from Y-12. When this plant is completed, water quality downstream of the sewage treatment plant will be significantly improved.

there appear to have been no irreversible or irretrievable effects on the terrestrial biota. Minor thermal, radioactive, biocidal, and chemical releases to the aquatic ecosystem have occurred and will continue. However, there is no indication that irreversible and/or irretrievable effects on the aquatic community have resulted from the construction and operation of the Y-12 facilities.

IV.A.5 Possible Conflicts Between the Proposed Action and the Objectives of Federal, State, and Local Land Use Plans, Policies, and Control

Prior to 1942, the principal land uses of the area were small-farm agriculture (pasturing cattle and hogs) and some limited tobacco and vegetable growing. Given the government acquisition of the original 56,000-acre block of land in 1942, no conflict exists at present between DOE's current use of land and local land use policies. Moreover, since DOE will most likely not need to acquire more land for expansion of its activities in the Y-12 area, there is no reason to expect any future conflict with local land use policies.

Although DOE's use of land is not in conflict with local land use policies, these local land policies are affected by the presence of the facilities. The present size and location of the Y-12 installation limits Oak Ridge's land use choices. Clearly, the reservation is land that cannot be developed privately or used by the city. Nevertheless, adequate vacant lands exist for the future growth projected by the City of Oak Ridge.

Operations at Y-12 comply with all Federal and state environmental laws, regulations, and permit requirements except for air emissions. Currently, source emissions requirements for suspended particulate matter from the steam plant are not met, however, emissions control facilities are being designed and funding for these controls is requested in the FY 1982 budget. The needed facilities are scheduled for completion in 1985.

IV.A.6 Energy Requirements and Conservation Potential

The energy consumed by Y-12 will not be increased by the proposed action. In fact, energy consumption has been decreased in recent years. Switching to coal as the primary fuel source represents a change to our most abundant fuel source.

The Y-12 personnel are constantly reviewing and evaluating operating procedures involving energy consumption. Those that have been deemed appropriate have been implemented. This approach to conservation will continue as an integral function at Y-12.

As with water, no irreversible and irretrievable commitments of air resources have occurred from past operation of the Y-12 facilities. Radiological, chemical, and particulate monitoring of air continues to evaluate compliance with existing standards. Correction of the air emission problems will allow the biota to respond favorably because current particulate deposition is not a permanent impact.

Materials of construction are almost entirely of the depletable category of resources. Concrete and steel constitute the bulk of these materials, but numerous other mineral resources are incorporated into the Y-12 facilities. No commitments have been made as to whether these materials will be recycled when their present use terminates.

Some materials are of such value that economics clearly promotes recycling. The DOE operations in Oak Ridge will contaminate only a portion of the materials to such a degree that radioactive decontamination will be needed to reclaim and to recycle the constituents. The quantities of materials that cannot be decontaminated for unlimited recycling probably represent very small fractions of the resources available in kind and in broad use in industry.

Construction materials are generally expected to remain in use for the full life of a facility. A long period of time will elapse before terminal disposition must be decided. After that time, quantities of materials in the categories of precious metals, strategic and critical materials, or resources having small natural reserves must be considered individually, and plans to recover and recycle as much of these valuable depletable resources as is practicable will depend on need.

The consumed resource materials, with the exception of uranium, have widespread usage; therefore, use of these materials in the operations must be considered reasonable with respect to needs in other industries.

Over the past 30-plus years, significant quantities of human labor resources have been irretrievably committed to the construction and operation of the Y-12 facilities. The benefits that have accrued and that continue to accrue from the operations of the Y-12 facilities fully justify the expenditure of this labor resource.

The Oak Ridge facilities have resulted in the significant land use alteration of about 5,900 acres from its original use. However, the remaining land areas of the reservation remain in a natural state, much as they were prior to Oak Ridge. A second-growth forest system and later pine plantations together cover about 80 percent of the reservation. These wooded areas provide natural habitat for many mammals and other biota, and the restricted nature of the Oak Ridge reservation has reduced hunting pressure which also enhances the survival of many species.

Although the alteration of land use has caused changes in the abundance, distribution, and location of flora and fauna within the Y-12 area, October 27, 1982

Department of Energy
Oak Ridge Operations
Attention: Mr. H. D. Hickman
Post Office Box E
Oak Ridge, Tennessee 37830

Gentlemen:

Mercury Contamination in East Fork Poplar Creek and Bear Creek

You recently received a copy of ORNL/CF-82/257, "Mercury Contamination in East Fork Poplar Creek and Bear Creek," issued September 7, 1982, which was a report of a study conducted by the Oak Ridge National Laboratory at our request. It should be noted that the authors included statisticians and laboratory personnel from the Y-12 Plant, as well as environmental scientists from ORNL. This study was undertaken after we had reviewed data on these creeks that had been obtained early in 1982. That data indicated the mercury concentration to be well above normal background levels. We had previously discussed the preliminary findings of this report with you. We also stated at that time that we would be making recommendations concerning the conclusions and recommendations reached by the authors when the final report was received.

This letter addresses these recommendations and the actions that we already have under way in some cases.

"4.2.1 Specific Actions

1. Consider the following actions to limit the quantity of mercury lost with sediments from the Y-12 Plant area:

   a. identify, decontaminate, and stabilize (or physically isolate) the area(s) yielding mercury-contaminated sediments to New Hope Pond; and

   b. design and implement future dredging plans for NHP to minimize sediment resuspension and loss to EFPC."

We concur with Part 1.a. and, indeed, have programs under way to enhance our knowledge of the source and quantity of mercury lost from the Y-12 Plant. A study to determine (1) the location(s), forms, and rate of *mercury release; and (2) if New Hope Pond acts as a source or sink for mercury during normal and storm flows has been initiated and should be completed about June, 1983. Following this study, recommendations for additional analysis and/or action will be made. As for Part 1.b., New Hope Pond was last dredged in 1972. We are awaiting the results of the study under way prior to making a decision regarding future dredging of New Hope Pond.*

"2. Consider the following actions in light of mercury concentrations found in fish in EFPC:

a. notify the Tennessee Department of Public Health of the mercury contamination of fish in EFPC; and

b. post DOE property at thost locations along EFPC used by bank fishermen and boat fishermen."

The Tennessee Department of Public Health has requested ORO to supply raw data pertaining to metals and organic contamination of fish and sediments in Poplar Creek and adjacent segments of Clinch River. Copies of this report have been prepared for submission.

We have reservations about posting DOE property along EFPC used by fishermen. Fishing is not common in EFPC, mainly because fish are not plentiful. Chances that anyone could catch and eat enough fish from this creek to accumulate a concentration of mercury in blood to cause health problems are practically nil. Continued monitoring in conjunction with Y-12 Plant efforts to locate and decontaminate/isolate presently active sources of mercury entering those waters is necessary. This study should be completed in about nine months, at which time we will reconsider our reservations about posting DOE property. Eliminating active sources may allow nature to mitigate the situation (reduce mercury concentration in fish below the FDA action guide of 1 ug/g over time). In essence, we feel that posting is premature at this time.

"3. Consider the following action in light of mercury concentrations calculated for beef from cattle grazing along EFPC: measure the concentration of mercury in hair from cattle or horses grazing along EFPC."

Additional data could be helpful; however, the number of cattle and horses grazing along EFPC is quite small, and obtaining statistically sound data would be a prolonged project. There are no present plans or authorization to do this. As we continue to study this problem, we will reassess this recommendation. We will consult with you before procuring any samples.

"4.2.2 Further Monitoring

1. Evaluate both the analytical and total procedural accuracy of the Y-12 analytical method at mercury concentrations greater than 1.1 μg/g using blind reference standards.

2. Evaluate further the historical mercury record contained in New Hope Pond sediments by

   a. measuring mercury concentrations in sediments as a function of sediment load currently washing into New Hope Pond;

   b. obtaining and analyzing additional sediment cores; and

   c. establishing an absolute chronology of mercury deposition in the pond.

3. Monitor mercury concentration in sediments in EFPC every two years and in Bear Creek every five years.

4. Following the start of operations of the new West End Sewage Treatment Plant, monitor in EFPC

   a. mercury concentration in fish,

   b. abundance and size distribution of the dominant sport fish populations, and

   c. sport fishing effort and catch."

We concur with this recommendation for further monitoring and are planning for future monitoring activities after completion of the study presently under way.

This report has served to alert us to the fact that mercury contamination of the aquatic environment around the Y-12 Plant will likely be a problem for some time. We have not used mercury for approximately 16 years, but, obviously, this has not been sufficient time for the concentration of mercury in sediment to drop to normal background levels. We must continue to monitor the environment on a regular basis to assess our situation and detect trends. We must also determine conclusively if, and where, mercury from the Y-12 Plant is entering the creek. Our present programs should provide this information. We would appreciate receiving your comments on the conclusions and recommendations reached by the authors of this study, as well as your view of our response to them.

We note that the results of this study differ quite markedly from those reported in the "Environmental Impact Assessment, Oak Ridge Y-12 Plant," March, 1982, prepared by Battelle Memorial Institute for the Department of Energy, a preliminary copy of which we are currently reviewing. The statement is made on Page IV-3 of this report to the effect that, since known concentrations of mercury are below "recommended standards for deposit removal (25 ppm total mercury)," stream sediments may be left intact without hazard to the surrounding environs. This conclusion is not supported by the data in ORNL/CF-82/257. We think it is important to call this discrepancy to your attention for your further consideration.

Very truly yours,

JCWhite

Gordon G. Fee, Plant Manager
Oak Ridge Y-12 Plant

GGF:JCW:jm

cc: H. D. Hickman, DOE-ORO (2)
G. G. Fee
R. F. Hibbs
R. G. Jordan
L. J. Peacock - RC
C. R. Richmond
J. C. White
R. D. Williams

The Y-12 Plant at Oak Ridge plays a significant role in the socioeconomic activities of the City of Oak Ridge as well as neighboring communities. It is not only the direct effects of employment and earnings that need to be examined but also the indirect effects through the multipliers that make themselves felt on other industries, such as sales, services, retail and wholesale trades, as well as financial institutions.

Should there be a major change in policy and the activities of the Y-12 Plant are altered from that of the status quo, it is important to note that the socioeconomic activity of the communities under consideration will be greatly affected. The direction and magnitude of change or impact are dependent upon the scenario for the proposed future action.

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The City of Oak Ridge is also in the process of constructing a new sewage treatment plant on East Fork Poplar Creek downstream from Y-12. When this plant is completed, water quality downstream of the sewage treatment plant will be significantly improved.

From 1982 Y-12
EIS

OFFICE MEMORANDUM

TO: Webb

DATE: April 22, 1982

FROM: Steve G.

SUBJECT:

In your deliberations for a Hg (etc.) study, and in your upcoming talks with Y-12 personnel about the Hg situation in E. Fork Poplar Cr., you might want to be aware of the verbage in the PDEA for Y-12 prepared by Batelle Columbus (March, 1982). I don't have a copy but some in Energy Div. do. Not much said about the Hg and PCB spills/effects, or about any other discharges, for that matter.

(just for your info, in case you were not aware the document existed).

UCN-3841
(12386 7-80)

OFFICE MEMORANDUM

TO: W. Van Winkle

DATE: 10 May 1982

FROM: Steve Gough

SUBJECT: Partitioning of Hg in aquatic-semi aquatic plants (ans. to ques. of yours dir. to my brother).

My brother indicated that one would expect the majority of the Hg present in plant tissues (at least of the type we collected) ~~would~~ to be in the methyl form. Percentages will vary, of course.

INTRA-LABORATORY CORRESPONDENCE
OAK RIDGE NATIONAL LABORATORY

June 11, 1982

TO: C. R. Boston

FROM: R. D. Roop R. D. Roop

SUBJECT: Mercury Contamination

The draft Environmental Analysis of the Operation of ORNL (ORNL-5870) identifies mercury contamination as probably the most significant nonradiological water quality degradation resulting from ORNL's operations. In your comments to me on the ORNL-EA, you indicated that this issue is likely to attract attention and that I should be prepared to provide information with which a reader could "put the issue into perspective". This memo provides additional background information on the possible sources of mercury contamination and its significance.

Because I had heard a vague report that mercury contamination was associated with Bldg. 4501, I asked John Boyle about past activities in the building. He confirmed that mercury had been used in the high-bay area of 4501 and referred me to John Drury. Boyle also noted that the building has drainage problems. The high-bay area is equipped with a sump, and during wet periods the pump would remove water from the sump almost continuously.

John Drury indicated that during the 1950's R&D on a lithium-isotope separation process were performed in Bldg. 4501. A small pilot plant, which used "ton quantities" of mercury, was set up in the high-bay area. The process was competing with the one used at Y-12 on a large scale, although the process under development at X-10 did not pan out. (Details of the lithium-isotope separation process are classified; however some of the unsuccessful aspects of the process development research were subsequently declassified.) Drury noted that, because of its density, mercury is difficult to work with. It can cause breakage of glassware, tubing, etc., and it is very difficult to clean up if spilled. Drury indicated that substantial quantities of mercury were undoubtedly spilled. He referred me to Ray Blanco, who was in charge of the project.

Blanco said that the pilot plant operated for approximately six months. In addition, there was associated experimental work which took place in the laboratories surrounding the pilot plant, and Blanco said that quantities of mercuric nitric acid were probably dumped down the lab drains after experiments. He was unable to tell me about the quantities of mercury spilled during pilot plant operation or any procedures attempted for cleanup. Blanco also suggested that we should estimate the mercury emissions from the power plant stack.

I can see three possible routes for the entry of mercury into the White Oak Creek system. First is the lab drains, second is water pumped from the sump of the high-bay area, and third, mercury may have entered the groundwater and subsequently reached the Fifth Street Branch or White Oak Creek.

The extent of mercury contamination can be summarized as follows: (1) fourteen bluegill collected from White Oak Lake and from White Oak Creek Embayment contained an average level of mercury in muscle approximately 5 times greater than the level in bluegill from the Clinch River (0.66 vs. 0.14 µg/g); (2) the FDA action level for mercury in fish muscle is 1.0 µg/g; (3) one out of 20 fish collected from the Clinch River had a mercury level exceeding the action level, while 2 out of 14 fish from the White Oak Creek system exceeded the level; (4) concentrations of mercury in water of White Oak Creek downstream from ORNL vary from 0.2 to 0.4 µg/L, while concentrations upstream from ORNL are 0.02 µg/L; (5) average concentrations in White Oak Creek exceed the EPA criterion of 0.14 µg/L, but so do the ambient average levels of 0.36 µg/L in the Clinch River at Melton Hill Dam (reason for these levels unknown); and (6) average concentration of mercury passing White Oak Dam is 0.09 µg/L, below the EPA criteria level.

There is no indication of any substantial discharge of mercury in ORNL wastewaters, and the pattern of contamination suggests to me that the current problem is due at least in part to contamination of sediments resulting from past discharges. Unfortunately, there are essentially no data on the concentrations of mercury or most other contaminants in sediments of White Oak Lake.

The principal problem with the mercury is the possible ingestion of contaminated fish by sport fisherman who take fish from the Clinch River in the 3-5 km reach below Melton Hill Dam. The risk is fairly small, since the average levels of mercury in fish in the Clinch are in the "safe" range and the incidence of fish which exceed the action level appears to be small (roughly 5%). However, since sediments and fish do occasionally pass over White Oak Dam, White Oak Creek may be contributing to the problem. This may attract unwanted attention to ORNL.

The question of mercury contamination takes on added relevance because of recent data collected from East Fork Poplar Creek and Bear Creek. During Spring, 1982, a special task force in Environmental Sciences Division sampled mercury in organisms in these creeks, finding quite high levels (up to 30 µg/g). These data suggest that very high levels of mercury are present in fish in the populated areas of Oak Ridge, areas with no restrictions on fishing. The most extensive data on mercury in fish are available in the background aquatic studies for K-25. These data show that, upstream of K-25 but downstream from the confluence of Poplar Creek with East Fork Poplar Creek, the average mercury level for 90 fish was 0.30 µg/g, and 2% of the fish had levels exceeding 1.0 µg/g. Two largemouth bass had levels of 2.14 and 1.67 u/g, and 3 channel catfish had an average level of 0.52 µg/g. These levels were measured some 15-20 stream miles downstream from Y-12, the presumed source of contamination.

Thus, ORNL's mercury problem is almost trivial compared to other problems on the DOE reservation. Nonetheless, it represents a situation which undoubtedly merits further investigation so that a more complete assessment of risk can be made.

RDR/swp

CC: J. W. Boyle
    H. E. Zittel

bcc: Gough

July 18, 1977

C. A. Keller, Assistant Manager
for Operations

INTERIM ST[illegible]

1. A few h[illegible]h were collected from Poplar Creek and the Clinch River this Spring and specimens are being analyzed -- data expected within a month or so.

2. TVA has informally agreed to our proposal to include the Poplar Creek area in their ongoing Hg study and have requested ORNL be omitted. Formal confirmation (Krinkel to Hart) is expected shortly. They requested sediment data and this was provided.

3. Preliminary revised analyses of New Hope Pond effluent indicate very low levels of Hg are present. Y-12 is presently investigating the several influent sources. Even if found, none are expected to be significant.

4. The Y-12 Hg inventory which has been completed and reviewed, concludes no further excavation is warranted. Pending the results of the activity described in 3. above, we agree. A copy of the inventory is attached.

5. ORGDP is preparing an EIS and Y-12 is preparing an EIA -- both at HQ request. We believe the Hg-in-fish and sediment problem should be included only in Y-12's EIA.

H. D. Hickman 7-18-77
H. D. Hickman, Director
Manufacturing Division

T 7-15-77
W. H. Travis, Director
Safety & Environmental Control Division

OSE:JFW

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December 2, 1975

United States Energy Research and
Development Administration
Oak Ridge Operations
P. O. Box E
Oak Ridge, Tennessee 37830

Attention: Mr. R. J. Hart, Manager

Gentlemen:

I am writing in response to your letter of July 16, 1975 in which you inquired about what would be needed to upgrade the Environmental Analysis of ERDA Facilities in Oak Ridge to the status of a draft environmental statement.

As you know, we have completed our review of "The Preliminary Draft Environmental Analysis of Oak Ridge-ERDA Operations". Copies have been given informally to J. F. Wing of your staff. We will consider this draft to be "Official Use Only" until it is approved by UCCND and ERDA. In our opinion the current document, with some modification and editing, can be issued as an ERDA-ORO publication. We estimate that it can be ready to distribute in six months.

This document generally meets the guidelines for environmental assessments described in 10 CFR 11.7a, where the purpose of the assessment is defined as providing a basis for judging whether or not an environmental statement should be prepared in accordance with the precept in section 102(2)(C) of NEPA. If it is determined that ERDA should prepare a draft environmental statement, 10 CFR 11.55 describes it as an objective and meaningful evaluation of actions and their reasonable alternatives in light of all environmental considerations. As defined, we assume the evaluation should be somewhat comparable to those prepared for nuclear power reactors or proposed facilities of equal magnitude.

We have reviewed all past and present monitoring programs conducted by Y-12, ORGDP and ORNL and information available from a preliminary sampling program. This review has led us to the conclusion that a more comprehensive sampling program will be required to upgrade the assessment to an environmental statement. This is contrary to the opinion expressed in our September 5, 1974 letter. While we currently have in hand much of the descriptive material necessary for a statement, essential data on surface water and biota characteristics are lacking. The three major facilities considered have all maintained monitoring programs for both radioactive and nonradioactive materials for many years. However, these programs have normally been directed at demonstrating compliance with local, state, and Federal standards, and as such, do not provide the more complete baseline data conventionally assembled for an environmental statement.

A comprehensive sampling program to characterize the surface water and biota is outlined in the attachment. The program is designed to cover calendar year 1976. It is essential that it extend for a one-year period to adequately account for the effects of seasonal variations. At the same time, the material relating to process releases should also be updated with a current status date of September 30, 1976. This sequence of activities would allow us to provide ERDA with a Draft Environmental Statement ready for public release on July 1, 1977.

An estimate of the total cost for the sampling program and the preparation of the draft environmental statement is enclosed. We recognize that the sampling program is costly, but it appears to be what is required for an adequate environmental statement. Since the program that we have laid out would start in January, we would like to discuss its implementation in the near future.

Your letter requested identification of any deficiencies in the routine environmental monitoring program. While some modifications to these programs have been identified by the assessment and are included as part of the proposed sampling program, we feel final recommendations of changes can best be made upon completion of this program.

We will be pleased to discuss this in more detail if you desire.

Sincerely yours,

R. F. Hibbs, President

RFH:THR:lg

Attachments

cc: P. C. Fourney
R. G. Jordan - RC
C. J. Parks
H. Postma
P. R. Vanstrum
File

bc: S. I. Auerbach
F. L. Culler
W. Fulkerson
M. E. Ramsey
C. R. Richmond
M. W. Rosenthal
T. H. Row
E. H. Struxness

Summary of Estimated Cost for Draft Environmental Statement

	FY 1976	FY 1977
Sampling Program[1]		
ORGDP	128,000	98,000
Y-12	280,000	175,000
ORNL	242,000	198,000
Statement Preparation[2]	86,000	144,000
	736,000	615,000

*

sc
2/4/77

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[1] Sampling program costs are distributed on the basis of the physical relation of the facility to the surface water system under investigation, i.e., ORNL would bear all costs on White Oak drainage basins.

	Thousands
1. Capital	180
2. Chemical Analysis	
Water from existing stations	119
Water from temporary stations	158
Sediments and biota	340
3. Maintenance of stations and sample collection	99
4. Professional Staff	150
5. Data Management	75
	1121

[2] Statement preparation costs would be evenly distributed among the three facilities.

UNITED STATES
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
OAK RIDGE OPERATIONS
P. O. BOX E
OAK RIDGE, TENNESSEE 37830

AREA CODE 615
TELEPHONE 483-8611

April 22, 1977

Union Carbide Corporation
Nuclear Division
ATTN: Mr. Jerry Elwood, Bldg. 2001
Oak Ridge National Laboratory
Post Office Box X
Oak Ridge, Tennessee 37830

Gentlemen:

REPORT ON CONTAMINATION IN POPLAR CREEK AND THE CLINCH RIVER

In response to C. R. Richmond's March 22, 1977 subject letter, I have reviewed the report and think that overall it does a good job of describing the current status. Implementation of the recommendations will assist us in determining a future course of action. I believe steps have already been taken to follow up on some of the recommendations.

Since there are still many unanswered questions, including the level of threat, if any, to the public health and safety, I believe your current report should be considered as an interim status report. In addition, since the situation is quite sensitive from a public information standpoint, it is requested your report remain "Business Confidential" with the distribution not to exceed those on the list provided you at our December 20, 1976 meeting. I do not believe it is sufficiently understood at this time to warrant release of the information. Hopefully, the efforts now underway will lead us to that point.

Additional comments are enclosed.

Sincerely,

J. F. Wing

J. F. Wing, Chief
Environmental Protection Branch
Safety & Environmental Control Division

OSE:JFW

See Page 2 for enclosure and distribution

Enclosure:
Comments on 3/22/77 memo, CRR to
Distribution

cc w/encl:
R. G. Jordan, UCCND-Y-12
E. M. King, UCCND-ORNL
M. Sanders, UCCND-Y-12
S. S. Stief, UCCND-ORGDP

COMMENTS ON MEMO, C. R. RICHMOND TO DISTRIBUTION, DATED MARCH 22, 1977
SUBJECT: REPORT ON MERCURY CONTAMINATION IN POPLAR CREEK AND CLINCH RIVER

To my knowledge, the FDA has no action level for Hg in fish at this time. The 0.5 ppm level was proposed in the Federal Register, Vol. 39, No. 236, Friday, December 6, 1974, but has not been adopted.

Data for fish and sediment collected in Poplar Creek above the confluence of East Fork would be useful for comparison purposes.

A table listing species, length, and weight for each fish collected and the location would be helpful.

Page 19, paragraph 2, Figure 4, of the report states "...only the larger bluegill collected in PC-C exceeded the FDA limit of 0.5 ppm (Fig. 4)." From Figure 4 it appears about as many of the larger bluegill were below 0.5 ppm as exceeded it.

Page 26 - line 6. Are there plans to evaluate the question of passing the Hg contamination to the progeny? The work of McKim et al may not be directly applicable since we have no reason as yet to believe the Hg is in the water - only the sediment.

Page 33. In discussing the proposed FDA action level, it would be appropriate to expand that portion to include the safety factors built into the 0.5 ppm., i.e., the FDA uses the assumption that the average daily intake of fish and shellfish is 60 g/day which they say is actually much less in the U. S. (page 42739 of cited FR), and to include the essence of, "The Commissioner notes that a person would have to consume every day the extraordinarily high amount of 600 grams of fish and/or shellfish contaminated at the full 0.5 ppm level to reach the blood levels where symptons have been known to occur. Thus, some margin of safety is still provided for even the largest consumers of these foods." What the report states is true but seems to imply a situation more dire than is probably the real case. Something closer to 20 g/day is a more realistic intake figure.

Page 34 - Table 5. Inclusion of data for Kentucky and possibly one or two other lakes listed in reference a. should also be shown since it lists Hg concentrations in fish equalling or exceeding those for Poplar Creek, and there was no plan (to our knowledge) to restrict fishing or alert the public using those lakes. This might also be reflected in the text (mid-page 35).

Page 35 - Mercury in Sediments. When the two data points of 300 ppm are removed, there is very little variability. I agree that these data really do not shed much light on the question. Are there any plans to develop more suitable sediment data utilizing more refined sampling and analytical methods? In addition, I failed to find the number of PCM 10 sediment samples being discussed (Page 36 - Table 6 and bottom of page 37).

Enclosure

Page 39. You are correct concerning the lack of similar texture concerning Bear Creek sediment samples. We still have the left-over portions and they vary from fine silt to gravel.

Pages 41-42. The portion beginning with the last paragraph on page 41 and continuing through most of page 42 seems more detailed than necessary.

Page 43 - last seven lines. Although true, this is hindsight which will not help the current situation. Alteration of this section would negate use of reference 5 on page 47 and reference 3 on page 50.

Page 44 - Recommendation No. 3. UCC-ND has had a quality control program for environmental monitoring in operation for the past year or so.

Page 48. References 3 and 4 should not be cited in any publication since they will never be published. To cite them only in this document is probably acceptable since it is not intended for "outside" release.

OSE;JFW/vi
4/13/77

INTRA-LABORATORY CORRESPONDENCE
OAK RIDGE NATIONAL LABORATORY

Business Confidential

Date: March 22, 1977

Subject: Mercury Contamination in Poplar Creek and the Clinch River

To: C. R. Richmond, Associate Director for Biomedical and Environmental Sciences, Oak Ridge National Laboratory

From: J. W. Elwood, Environmental Sciences Division, Oak Ridge National Laboratory

Abstract

The East Fork of Poplar Creek (EFPC), Poplar Creek (PC), and the Clinch River (CR) below the mouth of Poplar Creek are contaminated with mercury. Concentrations of total mercury (Σ Hg) in muscle of all largemouth bass collected in Poplar Creek in 1976 exceeded the FDA action level for Hg in fish of 0.5 ppm, and 95% of the Σ Hg in these fish was in the methyl form. The permitted level of intake by humans of largemouth bass from Poplar Creek containing an average Σ Hg concentration of 0.73 ppm, is calculated to be 40 g/day, based on the FDA recommended maximum intake level of methylmercury. Largemouth bass weighing more than 200 g collected from the Clinch River at the mouth of Poplar Creek also contained Σ Hg concentrations in excess of the FDA limit and data for this species indicate that Σ Hg levels in the Clinch River are elevated 7 miles below the mouth of Poplar Creek relative to concentrations in largemouth bass from Melton Hill Reservoir. Sediment data show that Bear Creek and East Fork of Poplar Creek are potential sources of the elevated Hg concentrations in Poplar Creek and the Clinch River. Recommendations are given for further defining the sources of Hg contamination in these streams and for examining the mechanisms and rates of Hg transport in the Poplar Creek-Clinch River system.

materials (i.e., algae). Concentrations of Hg associated with suspended particulate matter in New Hope Pond are not measured in the nonradiolo~~gical monitoring progr~~am at Y-12, and monitoring data for the New Hope Pond discharge in 1971, 1972, and 1973 (UCCND 1972, UCCND 1973, UCCND 1974) do not indicate elevated levels of dissolved Hg in pond water. However, reported monitoring data for dissolved Hg are based on water samples which were composited over a week, filtered and then acidified with HNO_3. In view of the known instability of dissolved mercury in water samples, due to a combination of bacterial uptake and adsorption onto container walls, high volatility, sorption of Hg by filter material and formation of stable complexes with other organic materials in suspension (Avotins and Jenne 1975, Jenne and Avotins 1975), it is likely that reported concentrations of dissolved Hg (i.e., that Hg which passes through a membrane filter with an ∿ 0.4-μ pore size) in the New Hope Pond effluent (and in other water samples collected and processed in a similar manner) are in error on the low side. Thus, considering the fact that total Hg in the New Hope Pond effluent is not monitored, and measured concentrations of dissolved mercury in composite water samples probably underestimate actual concentrations released during the sampling period, it is not possible to state with certainty that elevated levels of Hg in sediments and fish in EFPC-PC are not due, in part, to recent discharges from New Hope Pond.

The lower segment of the East Fork of Poplar Creek is a slow, meandering stream, and even during periods of high discharge there does not appear to be significant scouring of bed sediments.

Elevated Hg concentrations have been found in the deeper strata of core samples from the East Fork of Poplar Creek above and below the sewage treatment plant and Poplar Creek (ERDA 1975a, Reece 1974), indicating that sediments in this drainage contaminated from previous releases of mercury have not been entirely scoured and transported downstream. Studies in Sweden and the United States have shown that mercury in contaminated lake sediments remains biologically available to aquatic food chains 15 to 25 years after emissions were stopped (Wallace et al. 1971, Jernelöv et al. 1975). Estimates of the "ecological half-time" (i.e., the time required for concentrations in aquatic food chains to decrease by one-half) for Hg in contaminated Swedish lakes after all discharges were stopped have ranged from 10 to 100 years (Jernelöv et al. 1975). Biological half-lives for mercury in fish have been estimated to range from 1 to 3 years (e.g., Burrows and Krenkel 1973, McKim et al. 1976). It is possible, therefore, that the elevated levels of Hg in sediments and fish in the East Fork of Poplar Creek, Poplar Creek, and the Clinch River are a result of previous discharges which have been retained in the sediments of these environs and which are still biologically available to aquatic food chains. ~~Although the data are limited, elevated Hg concentrations in fish from the East Fork of Poplar Creek, Poplar Creek, and the Clinch River were measured in 1970 (Sanders 1970, Bolton and Whitson 1971); the significance of the observed levels apparently was not fully appreciated at that time. Monitoring of Hg levels in fish or other biota from these environs, unfortunately, was not done, so the trend in concentrations over the past six years cannot be determined.~~

Recommendations

(1) Studies should be initiated to identify the source(s) and speciation of mercury in the East Fork of Poplar Creek, Bear Creek, Poplar Creek, and the Clinch River by determining the spatial distribution of mercury associated with sediments of selected size fractions and organic content in these environs. It is suggested that mercury associated with surface sediments be mapped in detail in New Hope Pond, the East Fork of Poplar Creek, Bear Creek, and Poplar Creek, above and below the confluence with the East Fork of Poplar Creek, and the Clinch River above and below the mouth of Poplar Creek.

(2) Additional sampling of aquatic food chains (i.e., benthic invertebrates, fish) in the East Fork of Poplar Creek, Poplar Creek, Bear Creek, and the Clinch River should be conducted in order to quantify the baseline levels of Hg contamination in biota in 1977 for comparison with future monitoring data. Fish sampling should be initiated in April in order to collect migrating species such as sauger and white bass which spawn in the Poplar Creek drainage. The sampling should be designed to collect all life history stages (i.e., eggs, fry, fingerlings, and adults of all age groups and sexes) of the species of interest. Analysis for Hg content of components of aquatic food chains in these contaminated environs and in control (uncontaminated) areas should be initiated as soon as possible and conducted on a regular basis (e.g., minimum of annually).

(3) A Quality Control Program for environmental monitoring of mercury (and other heavy metals) should be established. Methods of collection, preparation, and analysis of environmental samples

Revised

for Hg should be standardized so that data collected in the various monitoring programs at X-10, Y-12, and K-25 are comparable. For sediment samples, it is recommended that the < 63-μ size fraction (i.e., sediment particles that pass through a U.S. Standard 250-mesh sieve or a 230 Tyler Standard Sieve) be analyzed. Total mercury in the two size fractions (i.e., > 63 and < 63 μ) and in bulk sediments should be analyzed in select samples in order to check recoveries and to determine the distribution of mercury as a function of particle size. Sediment samples should be wet sieved as soon as possible after collection (and prior to freezing), dried at < 60°C, and quantitatively analyzed for Hg using flameless AAS. The dissolution method of sediment samples should follow the procedure recommended by the Environmental Protection Agency (see "Mercury in Sediments" on p. 134 of USEPA 1974). Quality control samples, including water, sediments, and biological materials, should be exchanged by all monitoring laboratories on a regular basis.

(4) Procedures for monitoring mercury in liquid effluents and surface waters should be modified so that both total and particulate mercury are measured. Dissolved mercury can then be determined by the difference. In addition, analysis should be done on grab samples collected under various flow regimes rather than on composite samples held over a week. Water samples should be collected in glass containers and acidified immediately after collection with concentrated Ultrex nitric acid. Holding times prior to analysis for mercury samples should be kept to a minimum, preferably < 12 hr. For particulate Hg, aliquots should be filtered immediately on collection

through a membrane filter (Nuclepore membrane filters are recommended because of their uniform pore size and low sorption of Hg by filter material) with a 0.4-μ pore size before adding the acid. For total Hg, the filtration is omitted, and the sample should be collected directly in a pre-acidified, baked glass volumetric container.

(5) Because of the agricultural utilization of the East Fork of Poplar Creek and its floodplain and the potential for deposition for Hg-contaminated sediments on the floodplain during high discharges, it is recommended that soils and vegetation along the East Fork of Poplar Creek be sampled and analyzed for Σ Hg.

Acknowledgments

I wish to acknowledge the contributions of John J. Beauchamp (Computer Sciences Division) for his help in the statistical analyses of the data presented herein; to Joe Gooch, Dave Carroll, and Robert Stark (Environmental Sciences Division), and Michael Ellis (K-25) for their help in collecting the fish; to Mike Mitchell for providing the sediment data for Poplar Creek; to Roy Morrow and Ruby Viator (Plant Laboratory at Y-12) for analyzing the fish samples for Hg and to Ralph Turner, Steve Lindberg, and Steve Hildebrand (ESD) for their technical review of this report. The interest, cooperation, and contribution of all the above individuals is appreciated.

①

Memo

concur –
WHT
PID
Fletcher
Hickman
OCC
D'Amico

to: Jerry Elwood
from: me

Subj: Report on contamination in Poplar Creek
and the Clinch River

In response to C.R. Richmond's March 22, 1977 subject letter, I have reviewed the report and think that overall it ~~is~~ does a ~~good~~ good job of describing the current status. Implementation of the recommendations will assist us in determining a future course of action. I believe ~~[illegible]~~ steps have already been taken to follow-up on some of the recommendations.

Since there are still many unanswered

questions including the level of threat, if any, to the public health and safety, I believe your current report ~~be~~ should be considered as an interim status report. In addition, since the situation is quite sensitive from ~~a~~ public information standpoint, it is requested ~~they~~ your report remain ~~as~~ "Business Confidential" with the distribution not to exceed those on the list provided you at our December 20, 1976 meeting. I ~~am not trying to hide the problem but~~ do not believe it is sufficiently understood at this

3

time to warrant release of the information. Hopefully, the efforts now ~~not~~ underway will lead us to that point.

Additional comments are enclosed.

—me

w/enclosure
C.C. 3 C.R. Richmond, ORNL
1 R.G. Jordan, UCC-ND, Y-12
2 E.M. King, ORNL
4 M. Sanders, Y-12
5 S.S. Stief, ORGDP

bCC. H.D. Fletcher, UEO
H.D. Hickman, Manuf.
J.T. Alexander, P.I.O.
W.H. Travis, S&EC
V.J. D'Amico, DAMO

To my knowledge, the FDA has no action level for Hg in fish at this time. [illegible] The 0.5 ppm level was proposed in the Federal Register, Vol. 39, No. 236 – Friday, Dec. 6, 1974, but [illegible] has not been adopted.

Data for fish and sediment collected in Poplar Creek above the confluence of East Fork would be useful for comparison purposes.

→ ¶

Pg. 19, ¶2 - and Fig. 4 - the report states "…. only the larger bluegill collected in PC-C exceeded the EPA limit of 0.5 ppm (Fig. 4)." From Fig. 4 it appears about as many of the larger bluegill were below 0.5 ppm as exceeded it.

A table listing species, length & weight for each fish collected and the location would be helpful.

Pg. 26 - line 6. Are there plans to ~~study~~ evaluate the question of passing the Hg

3.

contamination to the progeny? The work of McKim et al may not be directly applicable since we have no reason as yet to believe the Hg is in the water — only the sediment.

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Commissioner notes that a person would have to consume every day the extraordinarily high amount of 600 grams of fish and/or shellfish contaminated at the full 0.5 ppm level to reach the blood levels where symptoms have been known to occur. Thus some margin of safety is still provided for even the largest consumers of these foods."

What the report states is true but seems ~~[illegible]~~ to imply a situation more dire than is probably the real case. Something closer to 20g/day is a more realistic intake figure.

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pg. 35 - Mercury in Sediments. When the two data points of 300 ppm are removed, there is very little variability. I agree that these data really do not shed much light on the question. Are there any plans

6.

to develop more suitable sediment data ~~[illegible]~~ utilizing more refined ~~appropriate~~ sampling and analytical methods?

In addition, I failed to find the number of PCM 10 sediment samples ~~taken~~ being discussed (pg. 36 - Table 6 and bottom of pg. 37).

Pg. 39 - ~~your~~ you are correct concerning the lack of similar textures concerning Bear Creek sediment samples. We still have the different opinions and they vary from fine silt to gravel.

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seems more detailed than necessary.

pg. 43 – last 7 lines. Although true, this is hindsight which will not help the current situation. Alteration of this section would ~~[illegible]~~ negate use of reference 5 on pg. 47 and reference 3 on pg 50.

pg. 44. Recommendation No. 3. UCC-ND has had a quality control program for environmental monitoring in operation for the past year or so.

pg. 48. ~~Although~~ References 3 & 4 ~~Should~~ should not be cited in any publication since they will never be published. To cite them only in this document is probably acceptable since it is not intended for "outside" release.

DOCUMENTS PERTAINING TO THE ELWOOD REPORT

INTRA-LABORATORY CORRESPONDENCE
OAK RIDGE NATIONAL LABORATORY

March 22, 1977

To: C. R. Richmond, Associate Director of Biomedical and Environmental Research

(Auerbach)

From: S. I. Auerbach, Director, Environmental Sciences Division

Subject: BUSINESS CONFIDENTIAL Report on Mercury Contamination in the Poplar Creek-Clinch River Drainage

Attached for your review and distribution to individuals responsible for environmental safety and monitoring at the Oak Ridge-ERDA facilities are six copies of the BUSINESS CONFIDENTIAL report prepared by Jerry W. Elwood of the Environmental Sciences Division concerning mercury contamination in Poplar Creek-Clinch River drainage. The report contains an analysis of the data on mercury in fish and sediments collected in the drainage in 1976, and summarizes the available data on mercury in streams and reservoirs in this area. The literature on mercury in aquatic environments was also reviewed in order to provide readers with some perspective on the extent of mercury contamination in these environs. Several recommendations are made for studies to identify the source of the mercury, to determine the extent of the contamination, and to determine the current mercury discharges to surface waters from Oak Ridge-ERDA facilities.

Also attached for your approval and signature is the draft of a cover memorandum which you requested be prepared for distribution with the report. The distribution list on the cover memorandum was suggested by J. F. Wing, ORO-ERDA. The BUSINESS CONFIDENTIAL category was used, also at J. F. Wing's suggestion, to limit distribution of the report.

It is my understanding that when comments on the report have been received, a final BUSINESS CONFIDENTIAL report is to be prepared in the Environmental Sciences Division and distributed by you to the following individuals as well as to Laboratory Management:

S. I. Auerbach - ESD, ORNL
H. D. Fletcher - ERDA-ORO, Uranium Enrichment Operations Division
H. D. Hickman - ERDA-ORO, Manufacturing Division
R. G. Jordon - UCCND, Y-12
E. M. King - UCCND, X-10
J. A. Lenhard - ERDA-ORO, Research and Technical Support Division
J. L. Liverman - ERDA Headquarters, DBER, Washington, D. C.
M. Sanders - UCCND, Y-12
S. S. Stief - UCCND, ORGDP
J. F. Wing - ERDA-ORO, Safety and Environmental Control Division
J. W. Elwood - ESD, ORNL

SIA:jmd
Enclosures 7

MEMO ROUTE SLIP
Form AEC-93 (Rev. May 14, 1947) AECM 0240

☐ See me about this.
☐ Note and return.
☐ For concurrence.
☐ For signature.
☐ For action.
☐ For information.

TO (Name and unit)
H. D. Fletcher, UEO
H. D. Hickman, Manu.
Jim Alexander, PIO
W. H. Travis, S&EC
Vince D'Amico, AMO

INITIALS

DATE

TO (Name and unit)

INITIALS

DATE

TO (Name and unit)

INITIALS

DATE

REMARKS

AQUATIC STUDY - POPLAR CREEK AND CLINCH RIVER

The enclosed Business Confidential report describes the current status of efforts to characterize the extent of mercury contamination in the Poplar Creek-Clinch River drainage area. I have kept most of you up-to-date on the progress and potential problems. Although this report has a very limited distribution, several top UCC-ND management representatives have reviewed it and expressed concern even to the extent of one or two considering a press release. It is unlikely this will happen; however, I wanted to alert you to the current situation.

I consider this report to be simply a status report with a few worthwhile recommendations which I believe are already being explored. As I told the author in December, I do not believe we yet have a suitable sample of the fish upon which to base a decision for future action, if any. For that, reason additional fish collection is underway now.

We need to get together ASAP so I can get you views. April 6 will be my first opportunity.

FROM (Name and unit)
J. E. Wing, Chief
Environmental Pro. Br.

PHONE NO. 3-4176
DATE 4/1/77

Rec'd 9/1/76.

CONCENTRATIONS OF HG (mg/g)
in Stream Sediment

		JULY 1974	NOVEMBER 1974	JULY 1975	NOVEMBER 1975
CRM 13	SS 1	<0.1			<0.1
PC 0	SS 2	47		20	2
	SS 3			10	10
	SS 4			5	5
	SS 5	12		300	10
	SS 6	<1.5		<0.1	4
	SS 7	5		5	2
	SS 8			5	<0.1
	SS 9			<0.1	<0.1
	SS 10	<2.5		30	0.5
	SS 11			1	<0.1
	SS 12			1	250
	SS 13			<0.1	1
	SS 14			<0.1	<0.1
	SS 15			<0.1	<0.1
	SS 16			10	10
	SS 17	27		10	<0.1
Blair Bridge	SS 18	10		5	1
AVERAGE		<13	<6	<23	<16

6" Cores —

UNION CARBIDE
INTERNAL CORRESPONDENCE

NUCLEAR DIVISION

POST OFFICE BOX X, OAK RIDGE, TENNESSEE 37830

To (Name) Distribution
Division
Location

Date March 22, 1977

Originating Dept.

Answering letter date

Copy to J. F. Wing, ERDA, ORO ✓

Subject BUSINESS CONFIDENTIAL
Report on Mercury
Contamination in Poplar
Creek and Clinch River

In accordance with arrangements made at a meeting in R. G. Jordan's office at Y-12 on December 20, 1976, the attached BUSINESS CONFIDENTIAL report on mercury contamination in sediments and fish in the Poplar Creek-Clinch River drainage is being distributed to you for review and comment. This report contains an analysis of the data on mercury in fish and sediments collected in this drainage in 1976 and summarizes the available information on mercury in streams and reservoirs in this area. In addition, the literature on mercury in aquatic environments is reviewed in order to provide you with some perspective on the extent of mercury contamination in the Poplar Creek drainage. While the source(s) of the elevated mercury levels in fish and sediments observed in portions of the drainage could not be defined from available information, the data suggest several potential sources. Recommendations are made in the report for specific studies to identify the source(s) of mercury contamination as well as to define the extent of the environmental contamination downstream from ERDA facilities at K-25 and Y-12. Recommendations also are made to modify some of the liquid effluent monitoring practices at these facilities in order to more accurately quantify mercury discharges to surface waters.

After you have reviewed this report, please transmit your written comments by April 8, 1977, to Jerry Elwood, ORNL, Building 2001, X-10, telephone extension 3-1410. A final report will then be prepared and distributed to you.

C.R. Richmond
C. R. Richmond

Enclosure

Distribution: R. G. Jordan, UCCND, Y-12
E. M. King, UCCND, X-10
M. Sanders, UCCND, Y-12
S. S. Stief, UCCND, ORGDP

1977 APR 5 PM 2 00

UNION CARBIDE INTERNAL CORRESPONDENCE

NUCLEAR DIVISION

POST OFFICE BOX Y, OAK RIDGE, TENNESSEE 37830

To (Name) R. G. Jordan
Division
Location Building 9704-2

Date April 4, 1977

Originating Dept.

Answering letter date

Copy to File - NoRC

Subject Report on Mercury Contamination in Poplar Creek and the Clinch River

I have reviewed the subject report and offer the following comments for your consideration. The report is very thorough and analytical, and technically well done. It is written in the customary style expected in scientific journals. Consequently, the abstract stands out as not being written for the technical reader but for the layman. The first sentence is too positive, although I suspect the sentence is accurate. Since an abstract gets read and remembered far more than the report itself, I would strongly recommend it be rewritten, especially if the report is to receive wide exposure.

There are some inaccuracies that need correction. On page 3, the statement is made that a Spark-Source Mass Spectrograph was used by K-25 to analyze the samples for Hg. Actually, an emission spectrograph was used, an entirely different class of instrument. I have asked Roy Morrow to review these references and see that proper revisions are made. Incidentally, we should use the flameless atomic absorbance method for all samples, and this will be done in the future so that similar methodology is maintained throughout the four plants. On page 18, the last sentence in the first paragraph concerning inability to discriminate concentration differences at "low Hg levels" is meaningless without quantification of the term "low Hg levels."

Recommendation 3 is not entirely factual. Y-12 does have a quality control program which has been in existence for several years. We will soon have in operation a QC program for environmental samples that will include all four plants. We will also standardize sampling procedures so that interplant comparisons are meaningful.

I think it is extremely important that we convey to the outside world what our present program is. I think this update should be incorporated in the report. I will be available to discuss these points with you at your convenience.

JCWhite

J. C. White

JCW:jm

UNION CARBIDE

INTERNAL CORRESPONDENCE

NUCLEAR DIVISION

POST OFFICE BOX Y, OAK RIDGE, TENNESSEE 37830

To (Name) C. R. Richmond

Division

Location

Date April 13, 1977

Originating Dept.

Answering letter date

Copy to J. W. Elwood J. C. White
E. M. King J. F. Wing
M. Sanders File - NoRC
S. S. Stief

Subject

The report transmitted with your letter of March 22, 1977, has been reviewed. Comments and suggestions were given to Jerry Elwood yesterday. I believe we covered all the comments of Messrs. Abee, Sanders, Stief, White, and myself. I asked Jim White to review the report since we are dependent upon the analytical work of his people for more accurately quantifying the problem.

Jerry Elwood is to be complimented for the thorough analysis of available data and a well written report! We are already taking action to implement his recommendations.

It would be appreciated if you would limit the distribution of the report to those to whom you sent draft copies, to ERDA's contract administrators (Lenhard, Hickman, Fletcher), to Plant and Laboratory Managers (Case, Postma, Winkel) and to those in your organization who have responsibilities for the work.

R. G. Jordan

RGJ:cm

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE CORPORATION
NUCLEAR DIVISION

POST OFFICE BOX X
OAK RIDGE, TENNESSEE 37830

Distribution limited to
Recipients Indicated

ORNL
CENTRAL FILES NUMBER
ORNL/CF-77/320

DATE: June 6, 1977

SUBJECT: Mercury Contamination in Poplar Creek and the Clinch River

TO: C. R. Richmond, Associate Director for Biomedical and Environmental Sciences
FROM: J. W. Elwood, Environmental Sciences Division

cc: Distribution

ABSTRACT

The East Fork of Poplar Creek (EFPC), Poplar Creek (PC), and the Clinch River (CR) below the mouth of Poplar Creek were found to be contaminated with mercury based on analyses and comparisons of Hg concentrations in fish and sediments collected from these environs. Concentrations of total mercury (Σ Hg) in muscle of all largemouth bass collected in Poplar Creek in 1976 exceeded the FDA's proposed action level for Hg in fish of 0.5 ppm, and 95% of the Σ Hg in these fish was in the methyl form. The permitted level of intake by humans of largemouth bass from Poplar Creek containing an average Σ Hg concentration of 0.73 ppm, is calculated to be 40 g/day, based on the FDA recommended maximum intake level of methylmercury. Largemouth bass weighing more than 200 g collected from the Clinch River at the mouth of Poplar Creek also contained Σ Hg concentrations in excess of the FDA's proposed limit and data for this species indicate that Σ Hg levels in the Clinch River are elevated 7 miles below the mouth of Poplar Creek relative to concentrations in largemouth bass from Melton Hill Reservoir. Sediment data show that Bear Creek and East Fork of Poplar Creek are potential sources of the elevated Hg concentrations in Poplar Creek and the Clinch River. Recommendations are given for further defining the sources of Hg contamination in these streams and for examining the mechanisms and rates of Hg transport in the Poplar Creek-Clinch River system.

NOTICE This document contains information of a preliminary nature and was prepared primarily for internal use at the Oak Ridge National Laboratory. It is subject to revision or correction and therefore does not represent a final report. The information is only for official use and no release to the public shall be made without the approval of the Law Department of Union Carbide Corporation, Nuclear Division.

Recommendations

(1) Studies should be initiated to identify the source(s) and speciation of mercury in the East Fork of Poplar Creek, Bear Creek, Poplar Creek, and the Clinch River by determining the spatial distribution of mercury associated with sediments of selected size fractions and organic content in these environs. It is suggested that mercury associated with surface sediments be mapped in detail in New Hope Pond, the East Fork of Poplar Creek, Bear Creek, and Poplar Creek, above and below the confluence with the East Fork of Poplar Creek, and the Clinch River above and below the mouth of Poplar Creek.

(2) Additional sampling of aquatic food chains (i.e., benthic invertebrates, fish) in the East Fork of Poplar Creek, Poplar Creek, Bear Creek, and the Clinch River should be conducted in order to quantify the baseline levels of Hg contamination in biota in 1977 for comparison with future monitoring data. Fish sampling should be initiated in April in order to collect migrating species such as sauger and white bass which spawn in the Poplar Creek drainage. The sampling should be designed to collect all life history stages (i.e., eggs, fry, fingerlings, and adults of all age groups and sexes) of the species of interest. Analysis for Hg content of components of aquatic food chains in these contaminated environs and in control (uncontaminated areas) should be initiated as soon as possible and conducted on a regular basis (e.g., minimum of annually).

(3) The Quality Control Program for environmental monitoring of mercury (and other heavy metals) should be upgraded. Methods of collection, preparation, and analysis of environmental samples

for Hg should be standardized so that data collected in the various monitoring programs at X-10, Y-12, and K-25 are comparable. For sediment samples, it is recommended that the procedure for sampling surface sediments be carefully defined and standardized and the < 63-μ size fraction (i.e., sediment particles that pass through a U.S. Standard 250-mesh sieve or a 230 Tyler Standard Sieve) be analyzed. Total mercury in the two size fractions (i.e., > 63 and < 63 μ) and in bulk sediments should be analyzed in select samples in order to check recoveries and to determine the distribution of mercury as a function of particle size. Sediment samples should be wet sieved (using filtered water from the site where the sample was collected) as soon as possible after collection (and prior to freezing), dried at < 60°C, and quantitatively analyzed for Hg using flameless AAS. The dissolution method of sediment samples should follow the procedure recommended by the Environmental Protection Agency (see "Mercury in Sediments" on p. 134 of USEPA 1974). Quality control samples, including "blind" reference standards for water, sediments, and biological materials, should be exchanged by all monitoring laboratories on a regular basis.

(4) Procedures for monitoring mercury in liquid effluents and surface waters should be modified so that both total and particulate mercury are measured. Dissolved mercury can then be determined by the difference. In addition, analysis should be done on grab samples collected under various flow regimes rather than on composite samples held over a week. Water samples should be collected in glass containers and acidified immediately after collection with concentrated Ultrex nitric acid. Holding times prior to analysis for mercury

samples should be kept to a minimum, preferably < 12 hr. For particulate Hg, aliquots should be filtered immediately on collection through a membrane filter (Nuclepore membrane filters are recommended because of their uniform pore size, low Hg background, and low sorption of Hg by filter material) with a 0.4-μ pore size before adding the acid. For total Hg, the filtration is omitted, and the sample should be collected directly in a pre-acidified, baked glass volumetric container.

(5) Because of the agricultural utilization of the East Fork of Poplar Creek and its floodplain and the potential for deposition for Hg-contaminated sediments on the floodplain during high discharges, it is recommended that soils and vegetation along the East Fork of Poplar Creek be sampled and analyzed for Σ Hg.

~~Acknowledgments~~

~~I wish to acknowledge the contributions of John J. Beauchamp (Computer Sciences Division) for his help in the statistical analyses of the data presented herein; to Joe Gooch, Mack Stubbs, Dave Carroll, and Robert Stark (Environmental Sciences Division), and Michael Ellis (K-25) for their help in collecting the fish; to Mike Mitchell for providing the sediment data for Poplar Creek; to Roy Morrow and Ruby Victor (Plant Laboratory at Y-12) for analyzing the fish samples for Hg and to Ralph Turner, Steve Lindberg, and Steve Hildebrand (ESD) for their technical review of this report. The interest, cooperation, and contribution of all the above individuals is appreciated.~~

DISTRIBITION

1. S. I. Auerbach, ESD, ORNL
2. J. M. Case, UCCND, Y-12
3-4. J. W. Elwood, ESD, ORNL
5. H. D. Fletcher, ERDA-ORO
6. H. D. Hickman, ERDA-ORO
7. R. G. Jordan, UCCND, Y-12
8. E. M. King, UCCND, X-10
9. J. A. Lenhard, ERDA-ORO
10. H. Postma, UCCND, X-10
11-15. C. R. Richmond, UCCND, X-10
16. M. Sanders, UCCND, Y-12
17. S. S. Stief, UCCND, ORGDP
18. J. F. Wing, ERDA-ORO
19. R. A. Winkel, UCCND, X-10
20. Laboratory Records Department, RC
21. Laboratory Records Department

DOCUMENTS PERTAINING TO ORO-TVA CORRESPONDENCE

SUMMARY OF ORO-TVA CORRESPONDENCE REGARDING MERCURY IN FISH AND SEDIMENT

The DOE/ERDA Oak Ridge Operations (ORO) Office's first association relating to mercury in fish began with a letter, dated April 13, 1977, from Jack D. Milligan of the TVA to Jake Alexander of the DOE Environmental Protection Branch. The letter transmitted data on mercury in fish from selected TVA-managed rivers (Attachment 1).

On May 4, 1977, ORO and Union Carbide Corporation, Nuclear Division (UCC-ND) representatives met with Messrs. W. B. Nicholas, R. J. Ruane, and Jack D. Milligan of the TVA in Chattanooga. Mercury in fish data from 1976 from samplings of the Clinch River (Watts Bar Lake and Melton Hill Lake) and Poplar Creek were provided. Concentrations of mercury for some fish species averaged above the then 0.5 ppm U.S. Food and Drug Administration action limit for mercury in fish for fish captured in the Clinch River and Poplar Creek. However, these levels were similar to those then monitored for fish in Pickwick and Kentucky lakes. These were not then posted against game or commercial fishing and apparently were not of concern to the TVA. The DOE/ERDA developed a perspective from the meeting with TVA that the elevated levels of mercury found in the Poplar Creek did not constitute either a health hazard or a potential irreversible threat to the local environment. The FDA limit was designed to insure that the 98.2 percentile American fish consumer, one who ate 60 grams of fish per day, every day, did not become exposed to over 10,950 micrograms of mercury per year. Occasional ingestion of individual fish contaminated above the action level is provided for in the scheme of the FDA regulatory framework.

The meeting was concluded with both parties agreeing to investigate obtaining funding that would allow TVA to incorporate sampling of Poplar Creek and Watts Bar Reservoir in their regular monitoring program. In the years subsequent, the DOE has, each year, monitored Watts Bar Reservoir and has reported the resultant data in its annual environmental monitoring report, which is sent to the State of Tennessee, Department of Health and Environment, and the U.S. Environmental Protection Agency.

After the May 4 meeting, Earl Leming, Chief, Water Quality Division, Knoxville office of the Tennessee Department of Health and Environment, was briefed with the same information that was provided TVA. A copy of the letter summarizing the TVA meeting is included as Attachment 2.

On July 8, 1977, Jake Alexander of the ERDA Environmental Protection Branch submitted additional information relating to mercury around the Oak Ridge Reservation to Jack Milligan. This data included mercury in sediment information, a portion (pages 3-6 and 35-43) of a March 22, 1977, draft ORNL Report "Mercury Contamination in Poplar Creek and the Clinch River,"and a copy of a 1974 aquatic biology and sediment and water quality study for East Fork Poplar Creek (Attachment 3). On the portion of the draft report where it is indicated that words had been deleted, they have been marked in red ink from the words in the original draft of the report. The page numbers associated with the red inked words refer to the page numbers of the final ORNL report on which the deleted words appear. The deletions were made for three reasons: (1) to remove the name of a contractor employee to protect his privacy; (2) to remove statements believed to be speculative; and (3) to remove statements believed not to be relative to the technical information being provided to TVA.

Attachment 4 is a copy of the entire draft ORNL report. Attachment 5 is a copy of our comments on the draft report and Attachment 6 is a copy of the final report.

On August 2, 1977, Ralph H. Brooks, TVA, wrote to the ORO Manager that TVA had "agreed to design and implement a sampling survey for mercury contamination in the Melton Hill reservoir/Clinch River area in the vicinity of ORNL." TVA was reviewing data supplied to it by ORO in consideration of designing and implementing the sampling survey for execution in the fall of 1977 (Attachment 7).

On February 13, 1978, Jake Alexander provided Jack Milligan with fish and sediment sampling data from 1977 sampling efforts and pointed out that the area of interest is not solely near ORNL (Attachment 8).

On March 27, 1978, Ralph H. Brooks of the TVA wrote to the ORO Manager that, based on the rather extensive data base ORO had provided (Fish from the Clinch River - Poplar Creek area and sediment data from East Fork and Poplar Creek), TVA did not see the need to collect any additional samples in CY 1978, even though some of the fish data indicates guidelines of 0.5 micrograms/grams mercury in fish flesh is exceeded. TVA suggested they reappraise the situation in January 1979 and determine the need for additional sampling (Attachment 9).

No further correspondence on these topics occurred between TVA and DOE according to our records.

LIST OF ATTACHMENTS

1. Letter dated April 13, 1977, Milligan to Alexander, "Regarding Mercury in Fish Flesh"

2. Memo dated May 6, 1977, Wing to Travis, "Mercury in Fish in Poplar Creek: Meeting with TVA's Division of Environmental Planning, Chattanooga, Tennessee

3. Letter dated July 8, 1977, Alexander to Milligan, "Poplar Creek Monitoring Program for Hg in Fish"

   1975 Hg in Sediment ORGDP Map (104 Data Points) NOTE: This map is not available at this time; but will be forwarded as soon as possible.

   Draft Report dated March 22, 1977, "Mercury Contamination in Poplar Creek and the Clinch River," Pages 3-6 and 35-43.

   Report dated September 20, 1974, "Preliminary Aquatic Survey of East Fork Poplar Creek and Bear Creek, 1974"

4. Memo dated March 22, 1977, Richmond to Distribution, "Report on Mercury Contamination in Poplar Creek and Clinch River"

   Memo dated March 22, 1977, Elwood to Richmond, "Mercury Contamination in Poplar Creek and the Clinch River"

5. Letter dated April 22, 1977, Wing to Elwood, "Report on Contamination in Poplar Creek and the Clinch River"

6. Report ORNL/CF-77/320, dated June 6, 1977, "Mercury Contamination in Poplar Creek and the Clinch River"

7. Letter dated August 2, 1977, Brooks to Hart, "Regarding Sampling Survey for Mercury Contamination"

8. Letter dated February 13, 1978, Alexander to Milligan, "Poplar Creek Monitoring for Hg in Fish"

9. Letter dated March 27, 1978, Brooks to Hart, "Regarding Mercury Contamination"

July 8, 1977

Mr. Jack D. Milligan
Special Projects Staff
Division of Environmental Planning
Tennessee Valley Authority
248 401 Building
Chattanooga, Tennessee 37401

Dear Mr. Milligan:

Subject: POPLAR CREEK MONITORING PROGRAM FOR Hg IN FISH

In response to our telephone conversation of June 30, 1977, please find attached sections of several reports (none of which have been published for external distribution) that will provide some information on Hg found in stream sediment.

I will try to provide to you additional information that may become available. At this time, there is really very little information available, however.

For any formal communication on this subject between TVA's Division of Environmental Planning and ERDA-ORO, please address correspondence to Mr. R. J. Hart, Manager, Oak Ridge Operations Office, at the above address.

If there are any questions regarding the enclosed, please call me.

Sincerely,

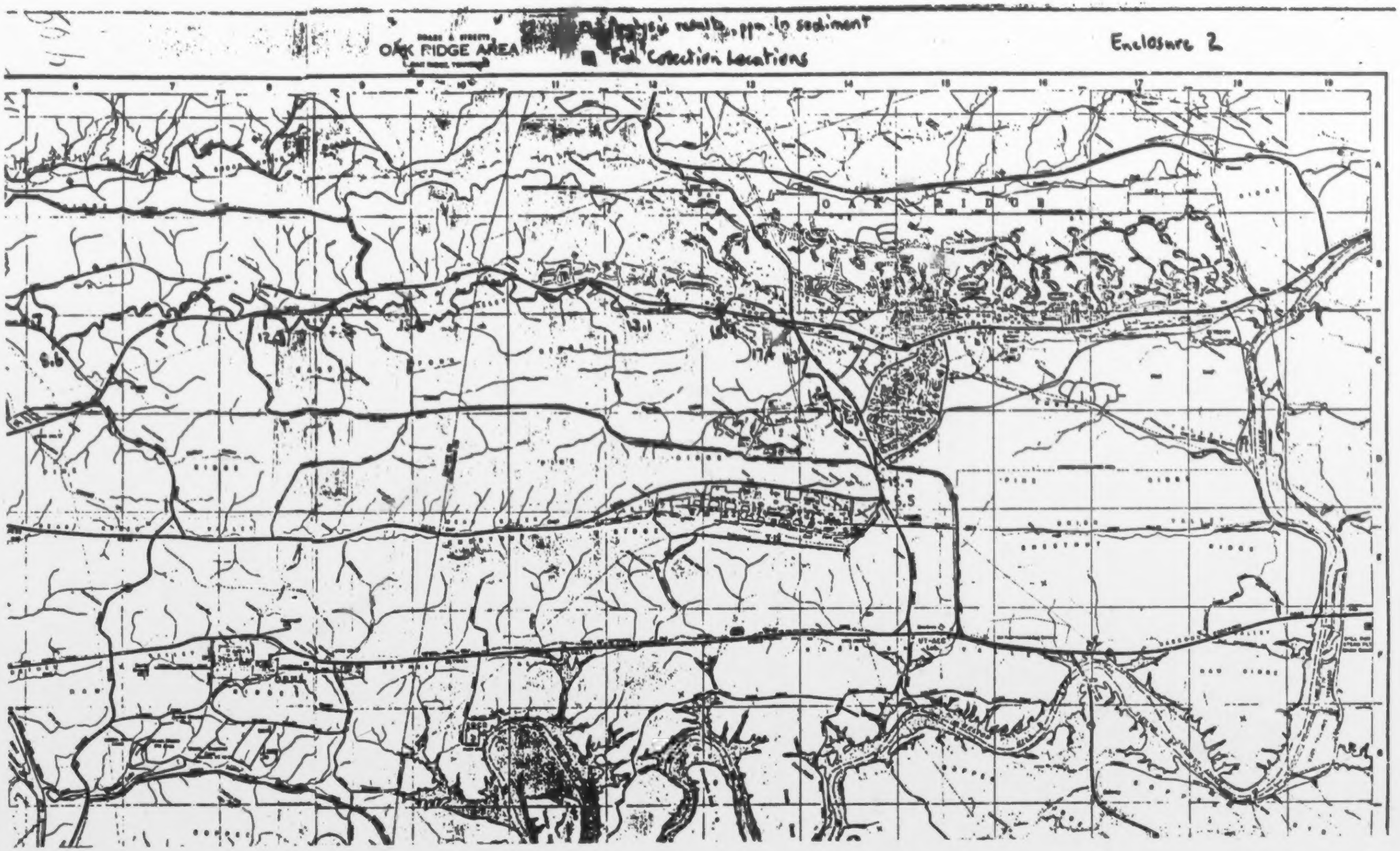
Jake Alexander, Environmental Engineer
Environmental Protection Branch
Safety & Environmental Control Division

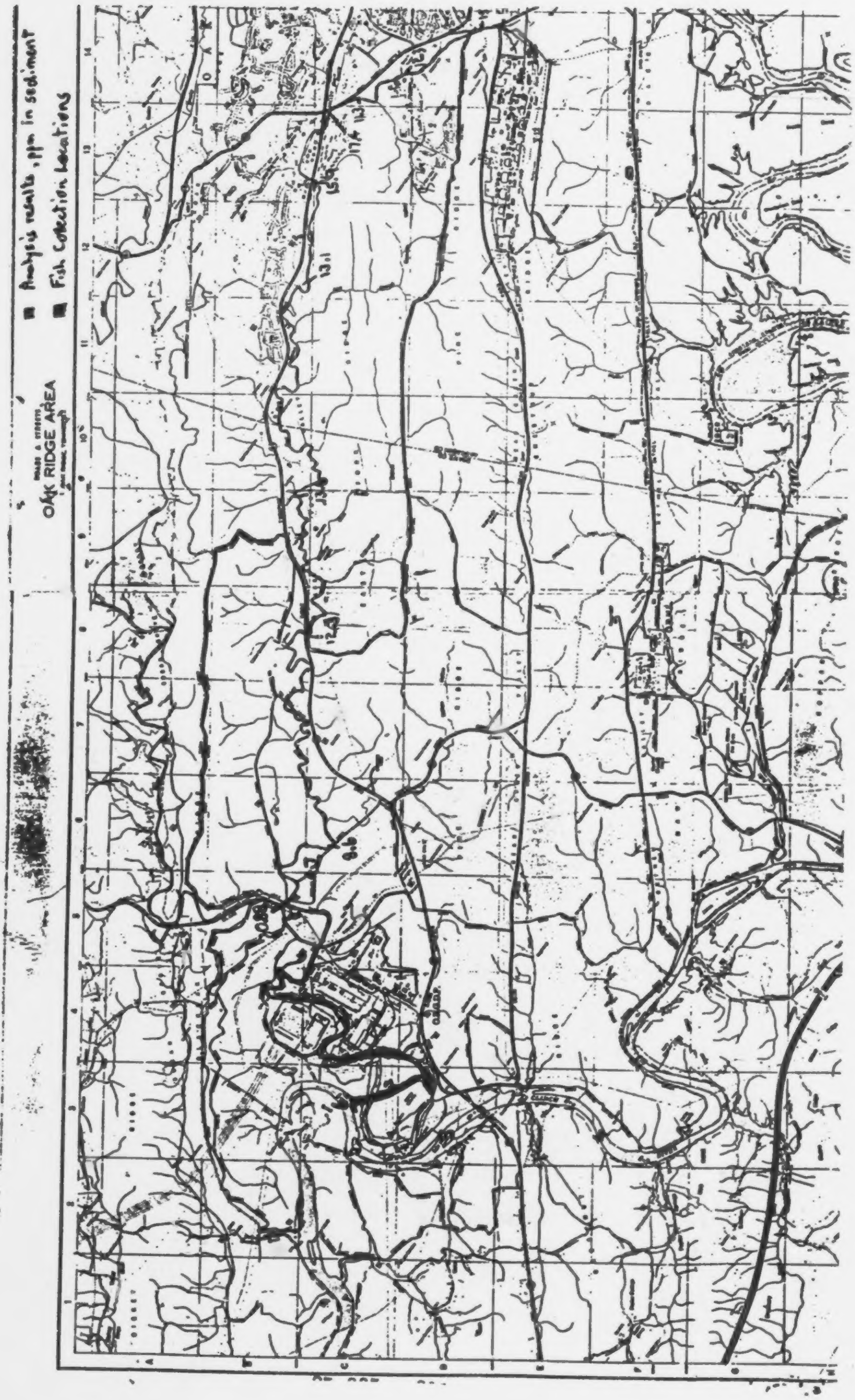
OSE:JKA

Enclosures:
As stated

Enclosures *:
1. 1975 Hg in Sediment ORGDP Map.
   (104 data points)
2. Pages 3, 4, 5, 6, & 35-43 of 3-22-77 draft rpt. "Mercury Contamination in Poplar Creek and the Clinch River" (with deletions per enclosed copy)
3. John Reece's 9/20/74 report

"Elwood report"


ROADS & STREETS
OAK RIDGE AREA
Analysis results, ppm in sediment
Fish Collection Locations
Enclosure 2
OAK RIDGE
15.7
5.5
6.6


OAK RIDGE AREA
Analysis results, ppm in sediment
Fish Collection Locations

"Mercury Contamination in Poplar
Creek and the Clinch River"
Draft 3-22-77 ORNL/CF-77/320

removed from ten fish collected in Poplar Creek (PC-1) and were analyzed for Σ Hg at Y-12 and at the Analytical Laboratory at ORNL using flameless AAS (i.e., one duplicate from each fish was analyzed at Y-12 and the other at X-10). In addition, muscle samples from each of these ten fish were analyzed for methylmercury (MeHg) at ORNL using a gas chromatographic method with a microwave emission spectrometric detector (Talmi 1975).

To examine total procedural accuracy for Σ Hg analysis was conducted at Y-12 on eight samples of bovine liver reference material certified by the National Bureau of Standards. All concentrations of Σ Hg in fish muscle reported herein are on a part per million (ppm) fresh-weight basis.

Bottom sediments from Poplar Creek were sampled for mercury analysis in July 1975 by the Environmental Management Group at K-25. Sediment core samples were collected with a gravity corer from PCM 0 to PCM 5 and in the West Fork of Poplar Creek in the vicinity of PCM 10. The upper 12 to 15 cm of sediment from each core was sent to the Chemical Analysis Department in the Technical Services Division at K-25 where it was wet sieved through No. 50-mesh screen (297-μ mesh opening). The < 297-μ size fraction was then dried in a steam oven at 80°C and 80 mg aliquots were analyzed for Hg using a Jarrell-Ash Spark-Source Mass Spectrograph (SSMS) with a D.C. arc. Detection limits for this sample size was 0.01 μg Hg. The estimated analytical precision of SSMS based on replicate analysis of a standard reference material is 10% ([redacted], personal communication). Replicate analysis of sediment samples was not conducted. All

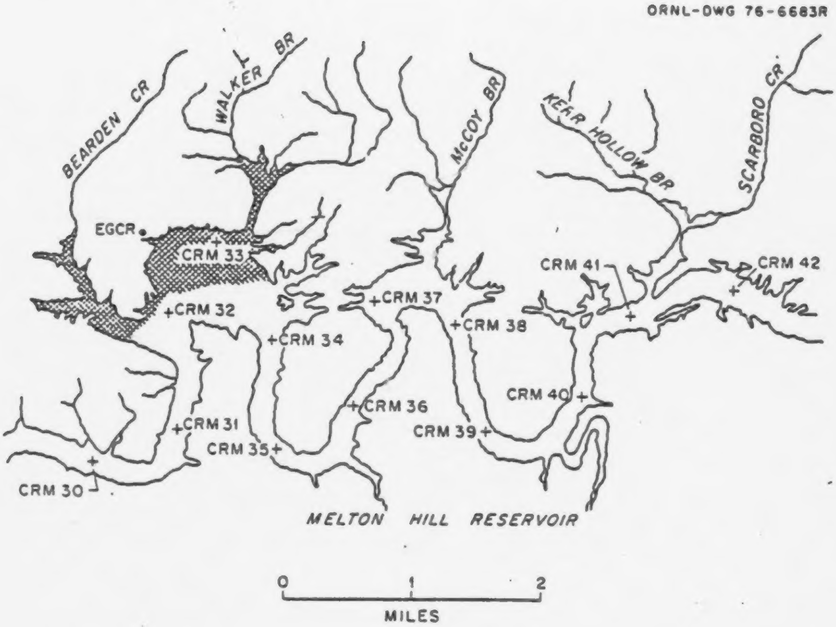

ORNL-DWG 76-6683R
BEARDEN CR
WALKER BR
McCOY BR
KERR HOLLOW BR
SCARBORO CR
EGCR
CRM 30
CRM 31
CRM 32
CRM 33
CRM 34
CRM 35
CRM 36
CRM 37
CRM 38
CRM 39
CRM 40
CRM 41
CRM 42
MELTON HILL RESERVOIR
0
1
2
MILES

Fig. 1. Section of Melton Hill Reservoir showing the location of control sampling area MH (shaded area) near the Experimental Gas-Cooled Reactor (EGCR).

sediment concentrations for Hg reported herein are on a part-per-million (ppm) dry-weight basis.

Sampling Locations

Fish were collected from eight sampling areas, including the Clinch River above and below the mouth of Poplar Creek, Melton Hill Reservoir, and Poplar Creek below the confluence with the East Fork of Poplar Creek. Locations of the eight sampling areas are as follows:

1. Melton Hill Reservoir (MH).--These samples were collected in Melton Hill in the vicinity of CRM 33. As a point of reference, this sampling area is in the vicinity of the Experimental Gas-Cooled Reactor (EGCR) (Fig. 1).

2. Clinch River (CR-1).--These samples were collected in the Clinch River from the confluence with the Emory River (approximately CRM 4.5) upstream to CRM 5.5 (Fig. 2).

3. Clinch River (CR-2).--These samples were collected in the Clinch River from CRM 9.5 to CRM 10.5 (Fig. 2).

4. Clinch River (CR-3).--Samples were collected in the Clinch River from CRM 10.5 to CRM 11.5 (Fig. 2).

5. Clinch River (CR-4).--Samples were collected in the Clinch River at the mouth of Poplar Creek at CRM 12 (Fig. 2).

6. Clinch River (CR-5).--Samples were collected in the Clinch River above the mouth of Poplar Creek from CRM 12.4 to CRM 13.5 (Fig. 2).

7. Poplar Creek (PC-1).--Samples were collected in Poplar Creek from the mouth (PCM 0) upstream to Blair Bridge located at approximately PCM 4.5 (Fig. 2).

ORNL DWG 76-19768

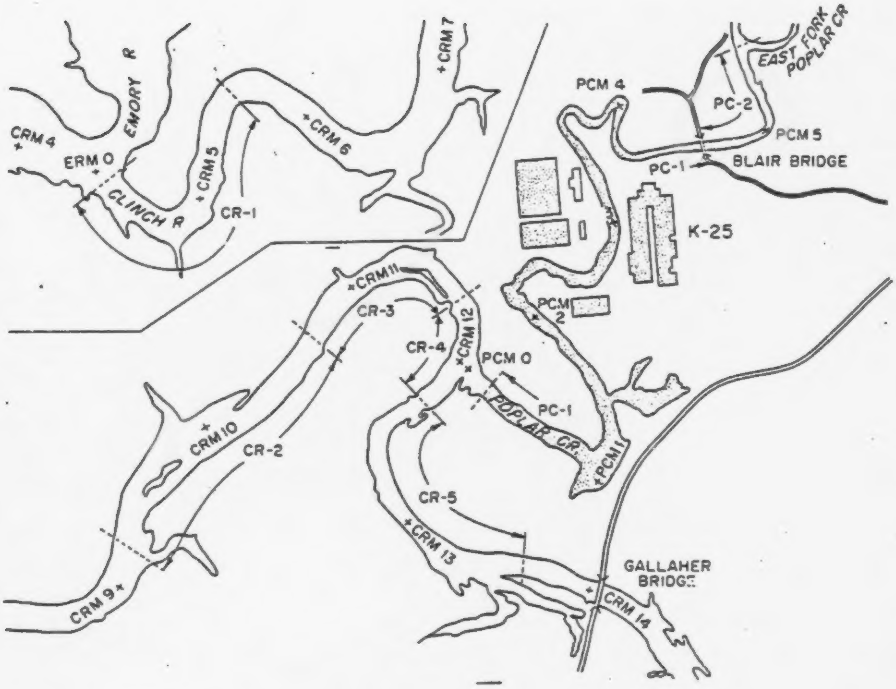

EMORY R
CRM 7
EAST FORK POPLAR CR
PCM 4
PC-2
CRM 4
ERM 0
CRM 6
PCM 5
CRM 5
CLINCH R
BLAIR BRIDGE
PC-1
CR-1
K-25
CRM 11
PCM 2
CR-3
CRM 12
CR-4
PCM 0
PC-1
POPLAR CR.
CRM 10
CR-2
PCM 1
CR-5
CRM 13
GALLAHER BRIDGE
CRM 14
CRM 9

Fig. 2. Sampling locations for fish in Poplar Creek (PC) and the Clinch River (CR).

obtained in this study for MH, with Σ Hg concentrations in bluegill and largemouth bass of < 0.1 ppm. Likewise, reported concentrations in bluegill and largemouth bass from Pickwick Reservoir (0.40 and 0.64 ppm, respectively), which received significant inputs of mercury from a chloralkali prior to 1971, are comparable to average values in the same species from Poplar Creek (0.37 and 0.73 ppm). These results suggest that in aquatic environments which receive little, if any, anthropogenic inputs of mercury, concentrations in fish muscle are < 0.1 ppm, while in contaminated environments, such as Pickwick and Cherokee Reservoirs and Poplar Creek, Σ Hg concentrations consistently exceed 0.1 ppm.

Mercury in Sediments

Concentrations of Σ Hg in surface sediments in Poplar Creek are given in Table 6. There is considerable variability (< 0.1 to 300 ppm Σ Hg) in the concentration of Σ Hg sediments collected from PCM 0 to PCM 5. Average Σ Hg concentration for all sediment samples collected in this section of Poplar Creek was 14.2 ± 48.3 (n = 74). The maximum concentration of 300 ppm was found in two samples collected between PCM 1 and PCM 2. These two samples have a significant effect on the calculated average concentration of Σ Hg in Poplar Creek sediments as indicated by the fact that the mean concentration and standard deviation are 6.3 ± 5.6 ppm, respectively, when these values are omitted.

The reason for the large variation in Hg concentrations in this section of Poplar Creek is unknown but probably is due in part to the analytical method used for analyzing the sediment

Table 6. Mean concentrations of Σ Hg ± 2 S.E. in the < 297 μ size fraction of surface sediments collected in sections of Poplar Creek and the West Fork of Poplar Creek (WFPC). Values in parentheses are concentration ranges.

Poplar Creek Mile	Σ Hg concentration (μg/g, dry weight)
0 - 1	8.6 ± 5.1 (< 0.1- 20)
1 - 2	45.0 ± 103.6 (< 0.1-300)[a]
2 - 3	8.9 ± 8.0 (< 0.1- 30)
3 - 4	4.6 ± 5.7 (< 0.1- 20)
4 - 5	3.4 ± 3.5 (< 0.1- 10)
Average for Poplar Creek	14.2 ± 48.3 (< 0.1-300)
West Fork of Poplar Creek (PCM 10)	All < 0.1

[a] The calculated mean concentration for this section when the two samples containing 300 ppm are omitted is 5.8 ± 3.1 ppm.

samples. Spark-source mass spectrometry (SSMS) is an inherently imprecise method when solid samples are analyzed because of the difficulty in obtaining a homogeneous sample matrix for analysis. In addition, a relatively small quantity of sediment sample ($\sim$ 80 mg) is used in the analysis. Part of the variability may also be a result of textural differences in samples submitted for Σ Hg analysis. Several studies have shown that mercury in river and lake sediments is associated predominantly with the smallest particle sizes which have the highest specific surface areas (i.e., cm^2/g sediment) and also frequently the highest content of organic matter (Cranston and Buckley 1972, Thomas 1972, Thomas and Jaquet 1976). Cranston and Buckley (1972), for example, found that 99% of the mercury in sediments from the La Have River Nova Scotia, was associated with sediment particles < 60 μ in size. Coarser particles, which include the sand-sized particles (62 - 2000 μ), are usually inert with respect to mercury, and these can be considered diluents in sediment samples (Thomas 1972). In comparative studies of mercury in sediments, it is thus necessary to assure that samples are texturally similar or that the particle-size distribution of samples is known. Sediment samples from Poplar Creek consisted of particles < 297 μ and, thus, may have contained a substantial amount of larger sediment particles (fine to medium sand) which would be expected to contain little or no mercury.

Concentrations of Σ Hg in all sediment samples collected in the West Fork of Poplar Creek (PCM 10) were < 0.1 ppm, which would seem to eliminate this stream as a source of the elevated levels of Σ Hg in sediments and fish in the lower section of Poplar Creek (PCM 0 to PCM 5) and in the Clinch River.

Sediment data for other tributaries in the Poplar Creek Drainage are limited. Only one sediment sample was collected in the East Fork of Poplar Creek (EFPC) in 1975, and it contained < 0.1 ppm of Hg. Sediments collected from EFPC in previous years, however, show elevated levels of mercury. In 1970, for example, mercury concentrations in sediments collected at three locations on EFPC (200 yards below New Hope Pond, in the area of Wiltshire Estate, and in the area of the Oak Ridge Country Club) ranged from 0.9 to 11.3 ppm, while sediments from New Hope Pond which drains into Poplar Creek contained 63 ppm of Hg (Sanders 1970). The analytical method and size fraction analyzed was not specified. In 1974, Reece reported concentrations of Σ Hg in bulk surface sediments analyzed with AAS from five locations in EFPC, ranging from 3 to 18 ppm (dry weight) (Reece 1974).

Reported concentrations of Σ Hg in Bear Creek are also highly variable. With the exception of a single sample containing 6 ppm, Σ Hg concentrations in bulk sediments, analyzed by AAS, collected from Bear Creek at five locations in 1974 were < 1 ppm, while sediments from Grassy Creek, an uncontaminated control stream located near Bear Creek, contained < 0.05 ppm Σ Hg (Reece 1974). Concentrations of Σ Hg in sediments collected from Bear Creek in conjunction with another environmental sampling program (ERDA 1975a), however, ranged from < 0.2 to 152 ppm with a mean of 13.4 ± 41.7 ppm ($n = 13$). Part of the variation in measured

Σ Hg in sediments from Bear Creek and the East Fork of Poplar Creek is due to the fact that bulk sediments were analyzed so all samples were probably not of similar texture. There may also be substantial spatial and temporal variation in Σ Hg associated with sediments in these streams as a result of variation in discharge. In any case, results for Bear Creek and the East Fork of Poplar Creek suggest that both of these streams may contribute to the elevated levels of Σ Hg in sediments and fish in Poplar Creek and the Clinch River.

Comparison of Mercury Concentrations in Sediments from Freshwater Environments

The average concentration of Σ Hg in the continental crust is estimated to be 0.08 ppm based on the assumption of equal abundance of basaltic and granitic rocks exposed to weathering in the continental crust (Taylor 1964), with reported concentrations in sedimentary rocks higher than in igneous rocks by a factor of 2 to 3 (Rankama and Sahama 1950). Sediments downstream of ore deposits or contaminated industrial discharges may contain from 0.2 to 200 ppm Hg (USGS 1970). Reported concentrations of Σ Hg in sediments of most lakes, rivers, and reservoirs, however, average < 1 ppm (Table 7), although these data must be interpreted with caution because of textural differences in the sediment samples. Sediments from freshwater environments which are known to have received significant anthropogenic inputs of Hg, such as Pickwick Reservoir, North Fork of the Holston River below Saltville, Virginia, and the western basin of Lake Erie associated with the

Table 7. Mean mercury concentrations (± 1 S.D.) in surface sediments of freshwater environments, including southeastern reservoirs. Values in parentheses are ranges.

Site	Sediment fraction analyzed	Σ Hg concentration (µg/g, dry weight)	
Lake Superior	Bulk sediment	0.083 ± 0.056	(0.004- 0.584)[a]
Lake Michigan (southern part)	Bulk sediment	0.146 ±	(0.030- 0.380)[a]
Lake Erie	Bulk sediment	0.582 ± 0.555	(0.008- 2.929)[a]
Lake Ontario	Bulk sediment	0.651 ± 0.507	(0.032- 2.100)[a]
Average for Great Lakes	Bulk sediment	0.347 ±	(0.004- 9.500)[a]
Fort Loudon (TRM[b] 604-650)	Not given	0.29 ± 0.10	(< 0.05 - 0.38)[c]
Watts Bar (TRM 555-579)	Not given	0.18 ± 0.01	(0.17 - 0.19)[c]
Chickamauga (TRM 484-508)	Not given	1.83 ± 1.91	(< 0.05 - 4.3)[c]
Nickajack (TRM 426-459)	Not given	0.37 ± 0.27	(0.21 - 0.91)[c]
Guntersville (TRM 351-424)	Not given	0.68 ± 0.61	(< 0.05 - 1.8)[c]
Pickwick (TRM 208-259)	Not given	7.82 ± 15.22	(< 0.05 - 73.0)[c]
Kentucky (TRM 24-203)	Not given	0.73 ± 0.56	(< 0.05 - 1.7)[c]
N. Fork Holston River (above Saltville, VA)	< 44µm	0.13 ± 0.02	(0.11 - 0.16)[d]
N. Fork Holston River (2 to 82 miles below chlor-alkali plant at Saltville, VA)	< 44	8.12 ± 6.32	(2.4 - 20.8)[d]
Cherokee Reservoir	< 44	1.92 ± 0.23	(0.48 - 2.13)[d]
Poplar Creek, TN (PCM[e] 0-5)	< 297	14 ± 4.06	(< 0.1 -300)[f]
West Fork of Poplar Creek, TN (PCM10)	< 297	All < 0.1[f]	

[a] Sources: Thomas, R. L., and J. M. Jaquet. 1976. Mercury in the surficial sediments of Lake Erie. J. Fish. Res. Board Can. 33:404-412; and Thomas, R. L. 1974. The distribution and transport of mercury in the sediments of the Laurentian Great Lakes system. pp. 1.1-1.16. In Proc., Int. Conf. on Transport of Persistent Chemicals in Aquatic Ecosystems, Ottawa.

[b] TRM = Tennessee River Mile.

[c] Source: Churchill, M., W. Fulkerson, P. A. Krenkel, and W. Sanders. 1971. A plan for studying mercury deactivation in Pickwick Reservoir. (unpublished report). 31 pp.

[d] Sources: Hildebrand, S. G., A. W. Andren, and J. W. Huckabee. 1976. Distribution and bioaccumulation of mercury in biotic and abiotic compartments of a contaminated river-reservoir system. pp. 211-232. In Andrew, R. W., P. V. Hodson, and D. E. Konasewich (eds.), Toxicity to Biota of Metal Forms in Natural Waters, Proc., Workshop International Joint Commission on the Great Lakes, Research Advisory Board; and Oak Ridge National Laboratory (ORNL). 1976. Ecology and Analysis of Trace Contaminants, Progress Report, October 1974-December 1975. ORNL/NSF/EATC-22. Oak Ridge, Tennessee. 200 pp.

[e] PCM = Poplar Creek Mile.

[f] This study.

Detroit River, contain Σ Hg concentrations that exceed 1 ppm (Table 7). Comparison of data in Table 7 with sediment data from Poplar Creek (Table 6), and the East Fork of Poplar Creek indicates that a significant amount of mercury contamination has occurred in this drainage.

[redacted]

Another potential source of the elevated mercury levels in Poplar Creek and the Clinch River is the City of Oak Ridge's sewage treatment plant located on the East Fork of Poplar Creek. Mercury contamination of sediments collected near municipal sewage treatment plants has been reported by several investigators (e.g., Cranston and Buckley 1972, Oliver 1973, Van Loon 1974). The increased mercury levels in sediments have been attributed to direct discharges of mercury in the liquid effluents from these sewage treatment facilities. In some cases, however, mercury contamination in aquatic sediments also has resulted from erosion and runoff of sewage sludge which has been shown to contain elevated mercury levels (Van Loon 1974).

It is highly probable that significant discharges of Hg were occurring from New Hope Pond into the East Fork of Poplar Creek prior to the time in 1971 when Hg-contaminated sediments in the pond were pumped to a holding basin on Chestnut Ridge. Because of the affinity of Hg for organic ligands, it is likely that most of the mercury discharged from New Hope Pond was associated with suspended particulate materials (i.e., algae). Concentrations of Hg associated with suspended particulate matter in New Hope Pond are not measured in the nonradiological monitoring program at Y-12, and monitoring data for the New Hope Pond discharge in 1971, 1972, and 1973 (UCCND 1972, UCCND 1973, UCCND 1974) do not indicate elevated levels of dissolved Hg in pond water.. However, reported monitoring data for dissolved Hg are based on water samples which were composited over a week, filtered and then acidified with HNO_3. In view of the known instability of dissolved mercury in water samples, due to a combination of bacterial uptake and adsorption onto container walls, high volatility, sorption of Hg by filter material and formation of stable complexes with other organic materials in suspension (Avotins and Jenne 1975, Jenne and Avotins 1975), it is likely that reported concentrations of dissolved Hg (i.e., that Hg which passes through a membrane filter with an ∿ 0.4-μ pore size) in the New Hope Pond effluent (and in other water samples collected and processed in a similar manner) are in error on the low side. Thus, considering the fact that total Hg in the New Hope Pond effluent is not monitored, and measured concentrations of dissolved mercury in composite water samples probably underestimate actual concentrations released during the sampling period, it is not possible to state with certainty that elevated levels of Hg in sediments and fish in EFPC-PC are not due, in part, to recent discharges from New Hope Pond.

The lower segment of the East Fork of Poplar Creek is a slow, meandering stream, and even during periods of high discharge there does not appear to be significant scouring of bed sediments.

Elevated Hg concentrations have been found in the deeper strata of core samples from the East Fork of Poplar Creek above and below the sewage treatment plant and Poplar Creek (ERDA 1975a, Reece 1974), indicating that sediments in this drainage contaminated from previous releases of mercury have not been entirely scoured and transported downstream. Studies in Sweden and the United States have shown that mercury in contaminated lake sediments remains biologically available to aquatic food chains 15 to 25 years after emissions were stopped (Wallace et al. 1971, Jernelöv et al. 1975). Estimates of the "ecological half-time" (i.e., the time required for concentrations in aquatic food chains to decrease by one-half) for Hg in contaminated Swedish lakes after all discharges were stopped have ranged from 10 to 100 years (Jernelöv et al. 1975). Biological half-lives for mercury in fish have been estimated to range from 1 to 3 years (e.g., Burrows and Krenkel 1973, McKim et al. 1976). It is possible, therefore, that the elevated levels of Hg in sediments and fish in the East Fork of Poplar Creek, Poplar Creek, and the Clinch River are a result of previous discharges which have been retained in the sediments of these environs and which are still biologically available to aquatic food chains. [redacted] Monitoring of Hg levels in fish or other biota from these environs, unfortunately, was not done, so the trend in concentrations over the past six years cannot be determined.

7 12t

Department of Energy
Oak Ridge Operations
P.O. Box E
Oak Ridge, Tennessee 37830

FEB 13 1978

(7)

Mr. Jack D. Milligan
Special Projects Staff
Division of Environmental Planning
Tennessee Valley Authority
248 401 Building
Chattanooga, Tennessee 37401

Dear Mr. Milligan:

Subject: POPLAR CREEK MONITORING FOR Hg IN FISH

Please find attached the following information:

Enclosure 1. - Analysis results of 238 fish samples taken during the summer of 1977; Tables I-VI

Enclosure 2. - Sediment Analysis data for East Fork samples during the summer of 1977; shown on map.

The mercury data for these samples had not been submitted to you in our earlier correspondence. Concentrations of Hg in these samples are generally lower than previously observed. Only a few samples exceeded 0.5 $\mu g/g$, while many were less than 0.1 $\mu g/g$. The tissue sections were dissolved using the procedure of Feldman (Anal.Chem. 46, 1606, 1974) and analyzed by flameless atomic absorption spectroscopy. National Bureau of Standards SRM 1575 (Pine Needles) and SRM 1571 (Orchard Leaves) were used to measure the quality of the mercury and uranium analysis. A summary of results for the SRMs for Hg in samples 1-183 is shown in Table II-1. A similar summary for samples 184-238 is shown in Table II-2.

Please note the following locations of the stations referenced in Table I:

Station 1 - Poplar Creek, River Mile 11.0
Station 2 - Poplar Creek, Creek Mile 5.0
Station 3 - Poplar Creek, Creek Mile 0.5
Station 4 - Clinch River, River Mile 15.5
Station 5 - Clinch River, River Mile 12.5
Station 6 - Clinch River, River Mile 12.0

These locations are numbered in blue on the map that is Enclosure 2. The red numbers on the map indicate Hg levels in sediment grab samples taken at twelve locations in East Fork and Poplar Creek. The creek is highlighted with a green line, as the resolution on this map is not particularly good.

We assume that TVA's Environmental Planning Division still intends to implement a mercury contamination survey on or near the Oak Ridge Reservation in the near future, in keeping with the August 2, 1977, letter to Mr. Hart from Ralph H. Brooks. Regarding Dr. Brooks' letter, please note that the areas where elevated mercury levels have been found in fish and sediment are in Poplar Creek and the Clinch River below Melton Hill Reservoir and are not in the immediate vicinity of the Oak Ridge National Laboratory. As shown on the enclosed map, the areas of interest are actually closer to the Oak Ridge Gaseous Diffusion Plant.

Please contact me at FTS 850-4176 when your plans become more definite so that we can make whatever access arrangements may be needed for Poplar Creek at ORGDP.

Sincerely,

James K. Alexander

James K. Alexander
Environmental Protection Branch
Safety & Environmental Control Division

OSE:JKA

Enclosures:
As stated

LEGAL ENVIRONMENTAL ASSISTANCE FOUNDATION
CENTRAL APPALACHIAN OFFICE
602 GAY STREET, SUITE 507 • KNOXVILLE, TENNESSEE 37902 • 615-637-5172

JUN 13

June 9, 1983

LEAF NOTICE OF INTENT TO SUE

SUIT FILED SEPTEMBER 1983

Mr. Donald Hodel
Secretary
U.S. Department of Energy
Washington, D.C. 20585

Dear Mr. Hodel:

Section 505(b) of the Clean Water Act, 33 U.S.C. Section 1365(b), and Section 7002 of the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. Section 6972(b) and (c), require that sixty days prior to the filing of a citizen suit in federal court against an alleged violator, notice must be given of the alleged violations to the alleged violator, the Environmental Protection Agency, and the state in which the alleged violations occur.

The Legal Environmental Assistance Foundation (LEAF), on behalf of its members who are affected by these violations, hereby places you on notice that it believes that the Department of Energy's Y-12 Plant in Oak Ridge, Tennessee, has violated and continues to violate the effluent standards or limitations under the Clean Water Act and the standards and regulations under the Resource Conservation and Recovery Act as specified below. LEAF is aware that DOE has taken the position that some or all of their waste disposal and effluent discharges are exempt from the Clean Water Act and/or RCRA. LEAF believes that this is an erroneous interpretation of these Acts and of the interplay between the Atomic Energy Act and these environmental statutes.

Clean Water Act Violations

1. 33 U.S.C. Section 1311(a), states that the discharge of any pollutant shall be unlawful unless in compliance with Sections 1311, 1312, 1316, 1317, 1328, 1342, and 1344 of the Clean Water Act. Section 1323 makes all of these sections applicable to federal facilites. 40 C.F.R., Part 122, Subpart D, contains requirements for submission of National Pollutant Discharge Elimination (NPDES) Permits which establish effluent standards and limitations for dischargers. DOE has violated and continues to violate Section 1311(a) and the regulations in 40 C.F.R., Part 122, Subpart D, by:

Headquarters: 2330 Highland Avenue South • Birmingham, Alabama 35205 • 205-324-0932

A PUBLIC INTEREST LAW FIRM

a. Discharging pollutants, including toxic metals and nitric acid, into Bear Creek from the S-3 Ponds, without an NPDES permit.

b. Discharging pollutants, including mercury, into Upper East Fork Poplar Creek from 50-100 discharge points, without NPDES permits.

c. Discharging pollutants, including PCB's and oil, to Bear Creek, from the Burial Ground Pond, without an NPDES permit.

d. Discharging pollutants, including PCB's and perchloroethylene, into Bear Creek from the Oil Land Farm, without an NPDES permit.

2. 33 U.S.C. Section 1342 requires that the effluent limitations of Section 1311 and 1317 be set and enforced through NPDES permits for discharges issued according to 40 C.F.R., Part 122. Your records show that DOE has violated NPDES permit number TN0002968 on numerous occasions. Some of the more recent violations include:

a. March 22, 1983, exceeded zinc limit

b. January 1, 1983, discharge of perchloroethylene, unpermitted

c. September, 1982, exceeded fluoride limit

d. June 10, 1982, dissolved oxygen limit violated

e. June 9, 1982, dissolved oxygen limit and oil and grease limit violated

f. June 8, 1982, dissolved oxygen limit violated

g. October 19 and 20, 1981, exceeded zinc limit

h. March, 1981, exceeded fluoride monthly average

i. March 19, 1980, exceeded suspended solids limit

j. January 3, 1980, exceeded zinc limit

There may be other violations during this time period, however, state records were incomplete.

3. DOE has also violated 33 U.S.C. Section 1342 and 40 C.F.R. Section 122.61 by discharging toxic pollutants from New Hope Pond, such as mercury, without reporting them and including them

in NPDES number TN0002968 permit applications.

RCRA Violations

1. 42 U.S.C. Section 6925(a) prohibits the disposal of any hazardous wastes except in accordance with permits issued pursuant to this section. Section 6961 makes this and other sections of RCRA applicable to federal facilities. LEAF believes that DOE has and continues to violate Section 6925(a) and the regulations implementing it (including, but not limited to 40 C.F.R., Parts 264, 265, and 267) by:

a. Treating, storing, or disposing of hazardous wastes, including metal plating sludges, metal plating solutions, nitric acid, hydrochloric acid, hydrofluoric acid, and halogenated solvents, in unlined surface impoundments (called the S-3 Ponds) without an interim status or final permit.

b. Treating, storing, or disposing of hazardous wastes, including mercury spill material and mercury contaminated sediments, in the Chesnut Ridge Sludge Basin, without an interim status or final permit.

c. Treating, storing, or disposing of hazardous wastes, including halogenated solvents, on the ground at the Oil Land Farm, without an interim status or final permit.

d. Treating, storing, or disposing of hazardous wastes, including halogenated solvents and cyanides, in the ground at the Isolation Area, without an interim status or final permit.

e. Disposing of hazardous wastes, including scrap metals, into two pit areas above the Oil Pond, without an interim status or final permit.

2. 42 U.S.C. 6922 and 40 C.F.R., Part 262 require generators of hazardous wastes to comply with certain notification and record-keeping standards. DOE has and continues to violate these provisions by not complying with any of these standards in regards to the generation of hazardous wastes at the Y-12 facility.

These continued violations of the Clean Water Act and RCRA pose a substantial hazard to the environment and public health in the Oak Ridge area. Contamination of surface waters and groundwater with toxic chemicals as a result of these violations has been widespread by your own records. The DOE, although engaged in national security activities, is not immune from the environmental laws that govern every other industrial facility in this nation. The Memorandum of Understanding signed by DOE, EPA, and the State of Tennessee, on May 26, 1983, regarding the Y-12 facility, does not sufficiently address the violations listed above, since it did not provide that DOE must comply with these environmental laws.

I believe that this notice of intent to file suit sufficiently states the grounds for complaint. If, however, you have any questions or wish to discuss the matter, please contact me.

Sincerely,

Gary A. Davis

Gary A. Davis
Legal Environmental
Assistance Foundation
Central Appalachian Office
602 Gay Street, Suite 507
Knoxville, TN 37902
(615) 637-5172

Of Counsel:
Dean Hill Rivkin
6608 Crystal Lake Drive
Knoxville, TN 37919
(615) 974-2331

cc: William Ruckelshaus
Administrator
Environmental Protection Agency
Washington, D.C. 20460

Charles R. Jeter
Regional Administrator, Region IV
Environmental Protection Agency
345 Courtland St.
Atlanta, GA 30365

Commissioner James Word
Tennessee Department of Public Health
344 Cordell Hull Bldg.
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Dr. Michael T. Bruner
Assistant Commissioner
Tennessee Department of Public Health
TERRA Bldg.
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Nashville, TN 37203

Governor Lamar Alexander
1st Floor, State Capitol
Nashville, TN 37219

Senator Howard Baker
522 Hart Senate Bldg.
Washington, D.C. 20510

Senator James Sasser
4260 Russell Office
Building
Washington, D.C. 20510

Rep. Albert Gore, Jr
1131 Longworth House
Office Bldg.
Washington, D.C. 20515

Rep. Marilyn Lloyd
2334 Rayburn Bldg.
Washington, D.C. 20515

MISCELLANEOUS CORRESPONDENCE

Department of Energy
Oak Ridge Operations
P. O. Box E
Oak Ridge, Tennessee 37831

September 23, 1983

Mr. Robert Nicholas
Investigations and Oversight Subcommittee
House Committee on Science and Technology
House Annex 1, Room 822
Washington, D.C. 20515

Dear Mr. Nicholas:

In response to your request of September 20, 1983, to Mr. G. G. Fee, Y-12 Plant Manager, enclosed is one copy each of the following documents:

1. Letter, G. G. Fee to H. D. Hickman, dated October 27, 1982, "Mercury Contamination in East Fork Poplar Creek and Bear Creek."

2. Internal Y-12 Plant memorandum, J. M. Napier to D. W. Smith, dated May 5, 1977, "Estimated Mercury Losses in Creek Waters - 1955-1975."

Please advise should you require additional information.

Sincerely,

H. D. Hickman

H. D. Hickman
Assistant Manager
for Defense Programs

DP:80-HDH

Enclosures:
As stated

UNION CARBIDE

UNION CARBIDE CORPORATION
NUCLEAR DIVISION
P. O. BOX Y, OAK RIDGE, TENNESSEE 37830

October 27, 1982

Department of Energy
Oak Ridge Operations
Attention: Mr. H. D. Hickman
Post Office Box E
Oak Ridge, Tennessee 37830

Gentlemen:

Mercury Contamination in East Fork Poplar Creek and Bear Creek

You recently received a copy of ORNL/CF-82/257, "Mercury Contamination in East Fork Poplar Creek and Bear Creek," issued September 7, 1982, which was a report of a study conducted by the Oak Ridge National Laboratory at our request. It should be noted that the authors included statisticians and laboratory personnel from the Y-12 Plant, as well as environmental scientists from ORNL. This study was undertaken after we had reviewed data on these creeks that had been obtained early in 1982. That data indicated the mercury concentration to be well above normal background levels. We had previously discussed the preliminary findings of this report with you. We also stated at that time that we would be making recommendations concerning the conclusions and recommendations reached by the authors when the final report was received.

This letter addresses these recommendations and the actions that we already have under way in some cases.

"4.2.1 *Specific Actions*

1. *Consider the following actions to limit the quantity of mercury lost with sediments from the Y-12 Plant area:*
    a. *identify, decontaminate, and stabilize (or physically isolate) the area(s) yielding mercury-contaminated sediments to New Hope Pond; and*
    b. *design and implement future dredging plans for NHP to minimize sediment resuspension and loss to EFPC."*

We concur with Part 1.a. and, indeed, have programs under way to enhance our knowledge of the source and quantity of mercury lost from the Y-12 Plant. A study to determine (1) the location(s), forms, and rate of mercury release; and (2) if New Hope Pond acts as a source or sink for mercury during normal and storm flows has been initiated and should be completed about June, 1983. Following this study, recommendations for additional analysis and/or action will be made. As for Part 1.b., New Hope Pond was last dredged in 1972. We are awaiting the results of the study under way prior to making a decision regarding future dredging of New Hope Pond.

"2. *Consider the following actions in light of mercury concentrations found in fish in EFPC:*

   a. *notify the Tennessee Department of Public Health of the mercury contamination of fish in EFPC; and*

   b. *post DOE property at thost locations along EFPC used by bank fishermen and boat fishermen."*

The Tennessee Department of Public Health has requested ORO to supply raw data pertaining to metals and organic contamination of fish and sediments in Poplar Creek and adjacent segments of Clinch River. Copies of this report have been prepared for submission.

We have reservations about posting DOE property along EFPC used by fishermen. Fishing is not common in EFPC, mainly because fish are not plentiful. Chances that anyone could catch and eat enough fish from this creek to accumulate a concentration of mercury in blood to cause health problems are practically nil. Continued monitoring in conjunction with Y-12 Plant efforts to locate and decontaminate/isolate presently active sources of mercury entering those waters is necessary. This study should be completed in about nine months, at which time we will reconsider our reservations about posting DOE property. Eliminating active sources may allow nature to mitigate the situation (reduce mercury concentration in fish below the FDA action guide of 1 ug/g over time). In essence, we feel that posting is premature at this time.

"3. *Consider the following action in light of mercury concentrations calculated for beef from cattle grazing along EFPC: measure the concentration of mercury in hair from cattle or horses grazing along EFPC."*

Additional data could be helpful; however, the number of cattle and horses grazing along EFPC is quite small, and obtaining statistically sound data would be a prolonged project. There are no present plans or authorization to do this. As we continue to study this problem, we will reassess this recommendation. We will consult with you before procuring any samples.

"4.2.2 *Further Monitoring*

1. *Evaluate both the analytical and total procedural accuracy of the Y-12 analytical method at mercury concentrations greater than 1.1 µg/g using blind reference standards.*

2. *Evaluate further the historical mercury record contained in New Hope Pond sediments by*

   a. *measuring mercury concentrations in sediments as a function of sediment load currently washing into New Hope Pond;*

   b. *obtaining and analyzing additional sediment cores; and*

   c. *establishing an absolute chronology of mercury deposition in the pond.*

3. *Monitor mercury concentration in sediments in EFPC every two years and in Bear Creek every five years.*

4. *Following the start of operations of the new West End Sewage Treatment Plant, monitor in EFPC*

   a. *mercury concentration in fish,*

   b. *abundance and size distribution of the dominant sport fish populations, and*

   c. *sport fishing effort and catch."*

We concur with this recommendation for further monitoring and are planning for future monitoring activities after completion of the study presently under way.

This report has served to alert us to the fact that mercury contamination of the aquatic environment around the Y-12 Plant will likely be a problem for some time. We have not used mercury for approximately 16 years, but, obviously, this has not been sufficient time for the concentration of mercury in sediment to drop to normal background levels. We must continue to monitor the environment on a regular basis to assess our situation and detect trends. We must also determine conclusively if, and where, mercury from the Y-12 Plant is entering the creek. Our present programs should provide this information. We would appreciate receiving your comments on the conclusions and recommendations reached by the authors of this study, as well as your view of our response to them.

We note that the results of this study differ quite markedly from those reported in the "Environmental Impact Assessment, Oak Ridge Y-12 Plant," March, 1982, prepared by Battelle Memorial Institute for the Department of Energy, a preliminary copy of which we are currently reviewing. The statement is made on Page IV-3 of this report to the effect that, since known concentrations of mercury are below "recommended standards for deposit removal (25 ppm total mercury)," stream sediments may be left intact without hazard to the surrounding environs. This conclusion is not supported by the data in ORNL/CF-82/257. We think it is important to call this discrepancy to your attention for your further consideration.

Very truly yours,

Gordon G. Fee, Plant Manager
Oak Ridge Y-12 Plant

GGF:JCW:jm

cc: H. D. Hickman, DOE-ORO (2)
G. G. Fee
R. F. Hibbs
R. G. Jordan
L. J. Peacock - RC
C. R. Richmond
J. C. White
R. D. Williams

OFFICIAL USE ONLY ACC. NO. 77--0303-94

UNION CARBIDE INTERNAL CORRESPONDENCE

NUCLEAR DIVISION POST OFFICE BOX Y, OAK RIDGE, TENNESSEE 37830

To (Name) D. W. Smith [redacted]
Division
Location

Date May 5, 1977
Originating Dept.
Answering letter date

Copy to G. B. Marrow
W. R. Martin
R. D. Williams
File (NoRC)

Subject Estimated Mercury Losses in Creek Waters - 1955 through 1975

Reviews of plant records and internal memoranda were made to determine the estimated amounts of mercury discarded in Poplar Creek waters. As a result, the amount of mercury which was discarded in creek waters from 1955 through 1962 was computed to be 235,000 pounds. Since 1962, the amount of mercury discarded in creek waters has been less than 5352 pounds. Since 1972, the creek waters have had a mercury level of less than 0.001 mg/ℓ (0.001 ppm) which is equivalent to less than 18 pounds per year.

Attached in Table 1 are a collection of estimated losses for record purposes. These data are also graphically shown in Figures 1 and 2.

J. M. Napier
J. M. Napier

tf

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Table 1

Summary of Estimated Mercury Losses in Poplar Creek

	Poplar Creek[1]		Building Losses[1]		Poplar Creek	
Calendar Year	Mercury Concentration (mg/ℓ)	Losses (lbs/Hg)	Mercury Concentration (mg/ℓ)	Losses (lbs/Hg)	Concentration (ml/ℓ)	Pounds (Hg)
1955	1.18	40,278	-	-	1.00	30,680
1956	0.88	28,695	-	-	1.00	30,974
1957	2.37	76,181	-	98,834	2.40	71,080
1958	2.01	56,605	-	53,417	2.20	66,069
1959	0.67	19,029	-	11,032	-	-
1960	0.20	6,094	-	1,732	-	-
1961[2,3]	-	4,767	-	-	0.21	6,216
1962[2,3]	-	3,828	-	-	0.11	4,344
1963[3]	-	-	-	-	0.024	932
1964[3]	-	-	-	-	< 0.030	< 550
1965[3]	-	-	-	-	< 0.080	< 1450
1966[3]	-	-	-	-	< 0.050	< 910
1967[3]	-	-	-	-	< 0.050	< 910
1968[3]	-	-	-	-	< 0.005	< 91
1969[3]	-	-	-	-	< 0.005	< 91
1970[3]	-	-	-	-	< 0.005	< 91
1971[3]	-	-	-	-	< 0.010	< 182
1972[3]	-	-	-	-	< 0.005	< 91
1973[3]	-	-	-	-	< 0.001	< 18
1974[3]	-	-	-	-	< 0.001	< 18
1975[3]	-	-	-	-	< 0.001	< 18

---

[1] Data collected from internal letters contained in folder #Q9-10 entitled "Mercury Losses (Poplar Creek)" from D. W. Smith.

[2] Data collected from Plant Records —Reports Y-1112, Y-1131, Y-1171, Y-1228 through Y-1232.

[3] Data obtained from internal letters and published information obtained from M. Sanders.

NOTE: Creek flow estimate from 1961 through 1975 was 6 x 10^6 gallons per day. Prior to 1961, flow data were reported and were a nominal 10 x 10^6 gallons per day.

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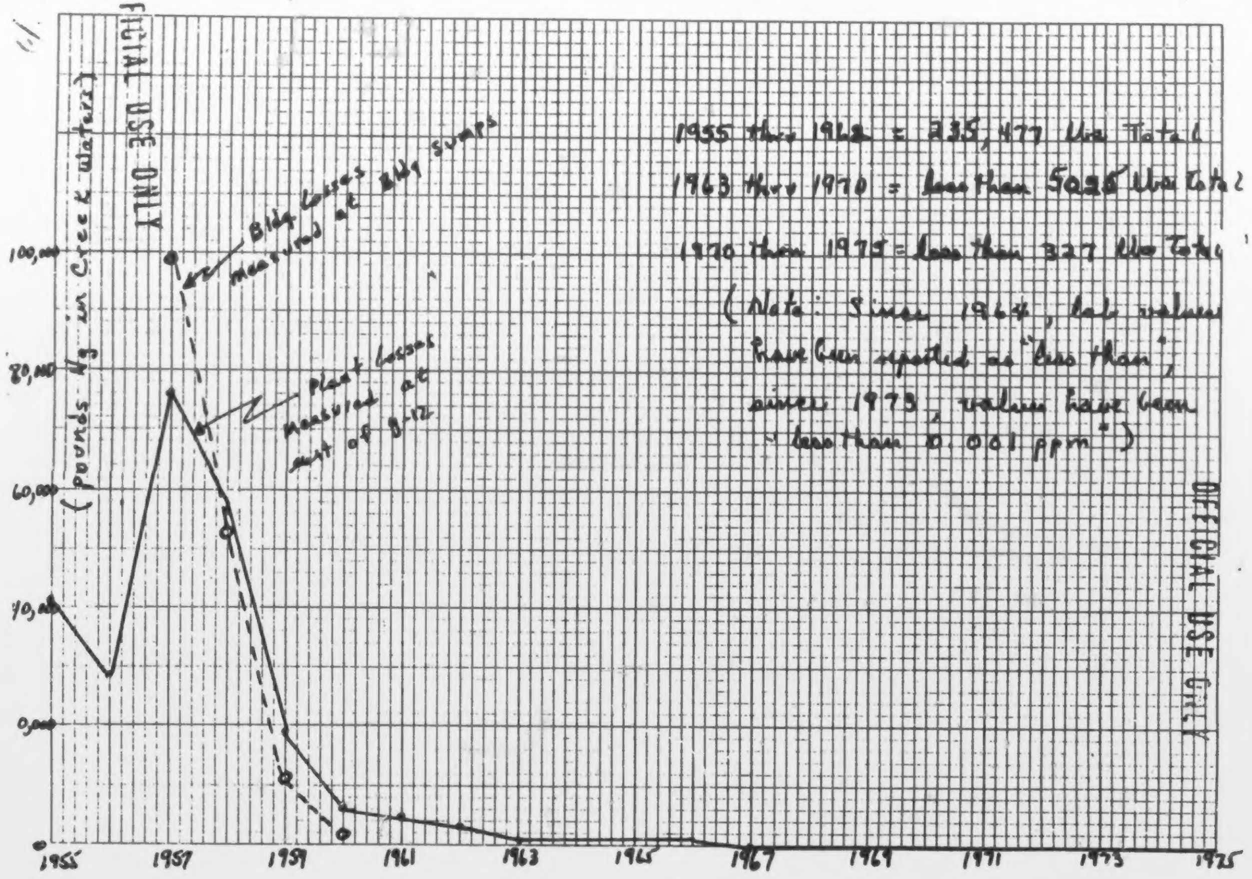

1955 thru 1962 = 235,477 lbs Total

1963 thru 1970 = less than 5025 lbs Total

1970 thru 1975 = less than 327 lbs Total

(Note: Since 1964, lab values have been reported as "less than"; since 1973, values have been "less than 0.001 ppm")

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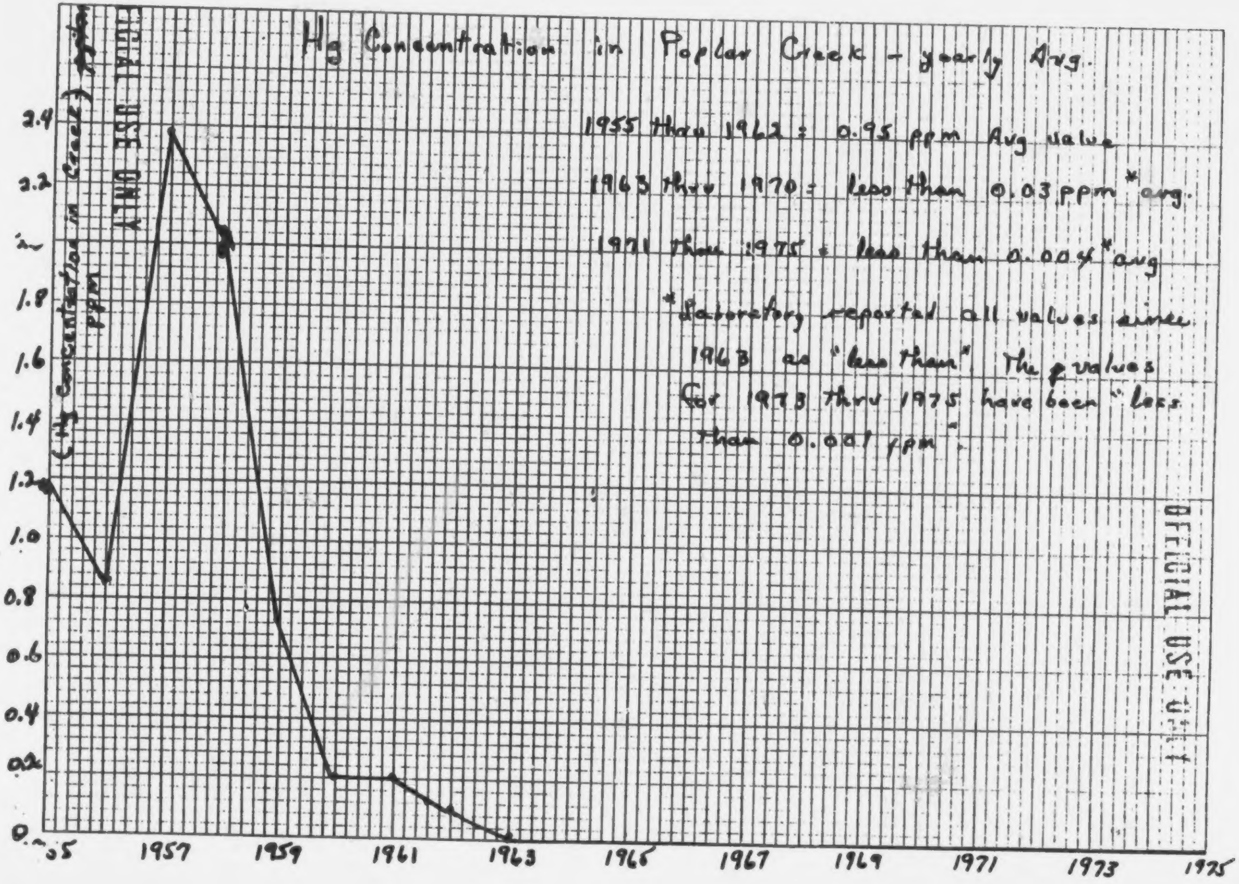
Hg Concentration in Poplar Creek - yearly Avg.



1955 thru 1962 : 0.95 ppm Avg value

1963 thru 1970 : less than 0.03 ppm * avg.

1971 thru 1975 : less than 0.004* avg

* Laboratory reported all values since 1963 as "less than". The ~~p~~ values for 1973 thru 1975 have been "less than 0.001 ppm".

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UNION CARBIDE CORPORATION
NUCLEAR DIVISION

SUPERVISOR'S REPORT

DATE OF INTERVIEW
28 April 1982 (?).

EMPLOYEE'S NAME	BADGE NO.	DEPARTMENT NO.
Stephen B. Gough	16558	ESD (42)

REASON
Collection of unauthorized samples relating to a sensitive issue

DETAILS

Gough met with S. I. Auerbach and W. Van Winkle. Auerbach initiated the meeting by asking Gough why he and his brother (Larry Gough, Branch of Regional Geochemistry, U.S. Geological Survey (USGS), Denver) had collected the samples. (The samples of concern were samples of mosses, liverworts, and willow roots collected Saturday, December 5, 1981, at three sites on East Fork Poplar Creek and one site on Bear Creek. The samples were analyzed for mercury in his brother's USGS laboratory). Gough responded that the idea came up spontaneously that Saturday when his brother was visiting. His brother's professional interests center on levels of trace metals in plant tissues, and Steve knew the East Fork Poplar Creek would be an interesting aquatic system because of his experience in preparing the K-25 EIS in 1980.

Auerbach pointed out that after being here six years he would expect an employee to know how the system works, and that he is astounded that Gough did not perceive the sensitivity of this issue. Gough responded that he did know the Y-12/Hg issue was sensitive, but that at the time he had not viewed the collection of samples as inappropriate. Auerbach responded that Gough had shown poor judgment and that the proper approach would have been to work through the system, regardless of the perceived low probability of obtaining authorization to collect such samples.

Auerbach asked Gough if he understood the message being communicated at this interview. Gough responded that he believed in working within the system and that with this "injudicious" exception he had. Auerbach pointed out that we cannot appoint ourselves as environmental policemen and that we must accept the constraints of the system, especially within the context of the policies of the sponsoring government agency.

(Continued on back of this page)

EMPLOYEE'S ACKNOWLEDGMENT OF RECEIPT OF COPY	SUPERVISOR'S SIGNATURE
	W. Van Winkle

DISTRIBUTION: EMPLOYEE RELATIONS DEPT.
FILE
OTHERS AS REQUIRED
S. I. Auerbach
C. R. Richmond

UCN-268
(235 12-73)

[illegible] from [illegible] by person other than [illegible] [illegible] protest [illegible] I believe it [illegible]

Auerbach brought up the need to guard against making an a priori judgment, even subconsciously, that there is a problem in a particular situation. The analogy with leakage from low level radioactive waste pits was discussed. With both this issue and the Y-12 /Hg issue relatively extensive monitoring has not demonstrated a health problem or an ecological effects problem. However, there is a sociological problem, and thus a potential economic problem, if this type of sensitive information is handled inappropriately. With both these issues what can be said is that further study and monitoring are needed because there may be a problem on subissues about which we have insufficient information, which was Gough's primary motive in collecting the samples.

The entire interview was cordial and ended on the note that every organization has guidelines by which one is expected to function and which must be understood and accepted, even if we do not like all of them. Gough's actions constitute an unintentional "misdemeanor" and not a "felony." Some good may have been accomplished in terms of stimulating further monitoring of mercury on the reservation. However, this was the wrong means for achieving such an end, and it is not a behavior pattern to continue.

Gough apologized for the problems he had caused and assured us that this one act was not indicative of a generic inability to perceive bureaucratically sensitive situations.

APPENDIX I

HAZARDOUS WASTE MANAGEMENT EVALUATION
OF THE OAK RIDGE OPERATIONS OFFICE
APRIL 1982

INTRODUCTION

An evaluation of the Oak Ridge Operations Office (OR) hazardous waste management program was performed as part of the Headquarters comprehensive appraisal of OR environmental protection, safety, and health protection (ES&H) activities on April 19-23, 1982, by Charles M. Campbell of the Office of Operational Safety. The evaluation was conducted in accordance with DRAFT DOE Order 548X, "Hazardous Waste Management for DOE Operations," and other appropriate DOE Orders. The evaluation was conducted through discussions with OR and OR contractor representatives; review of appraisals and other appropriate documents; and observations and discussions during visits to waste management facilities at the Oak Ridge Gaseous Diffusion Plant, Oak Ridge National Laboratory and the Y-12 Plant.

SUMMARY

The overall performance of OR in the area of hazardous waste management activities is considered, with few exceptions, to be OUTSTANDING.

The Environmental Protection Branch (EPB) of the Safety and Environmental Control Division (SECD) provides an independent overview of OR contractor hazardous waste management programs. The EPB also provides ES&H guidance and direction to OR contractors in the area of hazardous waste management.

OR has provided policy and direction to contractors stressing the OR position that contractors should establish hazardous waste management programs, and that these programs are to be based on Resource Conservation and Recovery Act (RCRA) and State requirements. The major OR contractors have established hazardous waste management programs. Some programs are fully comparable with these requirements. One major contractor does not yet have a comparable program.

Safety and Environmental Control appraisals of contractor hazardous waste management programs are conducted as an element of the annual Environmental Management appraisals. Appraisals of all major contractors were done in 1981 with emphasis being placed on hazardous waste management. More timely transmittal of appraisal reports to contractors would improve the appraisal program. The EPB is effectively monitoring and providing guidance to its contractors regarding handling, storage and disposal of polychlorinated biphenyls (PCB). The EPB has an effective network of communications, including information flow within OR, between OR and its contractors, and among contractors.

FINDINGS AND RECOMMENDATIONS

1.0 HAZARDOUS WASTE SAFETY RESPONSIBILITIES

1.1 THE SAFETY AND ENVIRONMENTAL CONTROL DIVISION RESPONSIBILITIES IN THE AREA OF HAZARDOUS WASTE MANAGEMENT ARE WELL UNDERSTOOD AND ACCEPTED EVEN

Hazardous Waste Management Evaluation. The overall performance of OR in the area of hazardous waste management activities is considered to be OUTSTANDING. OR has provided policy and direction to its contractors stressing the OR position that contractors should establish hazardous waste management program commensurate with State and Federal (RCRA) requirements. The Environmental Protection Branch provides an independent overview of the contractors hazardous waste management programs, as well as providing ES&H guidance and direction to OR contractors in the area of hazardous waste. The EPB appraisals of contractor hazardous waste management programs are conducted as an element of its annual Environmental Management Appraisal. Hazardous waste management was emphasized in the 1981 appraisals. The appraisal reports should be transmitted to the contractors in a more timely manner. The EPB is effectively monitoring and providing guidance to its contractors regarding the handling, storage, and disposal of polychorinated biphenyls. The EPB has an effective network of communications, including information flow within OR, between OR and its contractors, and between contractors.

Environmental Protection. The overall performance rating assigned to the OR environmental protection program is GOOD-OUTSTANDING. The EPB has been very effective in providing guidance, criteria, and policy to its contractors. EPB staff is considered adequate in numbers and well qualified in all but radiological functions, since EPB recently lost its fulltime environmental radiological specialist. Training is being provided to each member of the staff. Communications within OR, with contractors and Federal, State, and local environmental regulatory agencies are excellent. OR environmental protection appraisals have shown improvements in frequency, depth, and comprehensiveness, and should continue to improve with the implementation of the Appraisal Master Plan. EPB has been effective in assuring radiological and environmental effluents are appropriately monitored and controlled. However, ORNL capabilities for monitoring routine and nonroutine radionuclide emissions need to be strengthened. Effluent data submissions are being properly addressed, and the annual environmental reports of all OR contractors are of high quality.

1.0 PERFORMANCE: PERSONNEL SAFETY, PROPERTY LOSS, VEHICLE ACCIDENT, AND RADIATION EXPOSURE STATISTICS

1.1 PERSONNEL SAFETY (1977-1981). OR CONTRACTORS FATALITY AND INJURY/ILLNESS RATES ARE LOWER THAN THE DEPARTMENT AVERAGES, WITH THE INJURY/ILLNESS RATES SHOWING DOWNWARD TRENDS. OR SUBCONTRACTOR INJURY/ILLNESS RATES ARE HIGHER THAN OVERALL OR RATES, WITH THEIR TOTAL REPORTABLE CASES IN 1981 EXCEEDING THE AVERAGE DOE 77-80 CONSTRUCTION RATE.

- OR experienced one fatality (electrical shock at Paducah, GDP in 1977) resulting in a fatality rate of 0.8 fatalities/100,000 worker years compared to the average DOE rate of 7.6. The previous fatality occurred in 1968.

- OR occupational injury/illness average incidence rates were:

  (1) Lower than the overall average of other DOE incidence rates and,

2

FUNDING HISTORY OF "CENTRAL POLLUTION CONTROL FACILITY," Y-12 PLANT, OAK RIDGE OPERATIONS, DEPARTMENT OF ENERGY

FY 1979 Budget. Design of the CPCF ($1.233 million) was performed under 39 GB 03-79008(160), "Project Engineering and Design for Control of Effluents and Pollutants - Y-12," as a part of the FY '79 Budget Authorization (P.L. 95-1108) and the FY '79 Budget Appropriation (P.L. 95-1247) for weapons programs.

FY 1981 Budget. Project 39 GB 03-81D120, "Control of Effluents and Pollutants," was proposed as an FY '81 line item. $3.0 million was authorized (P.L. 96-540) and the same amount was appropriated (P.L. 96-540). The $3 million was insufficient to award a fixed price contract for construction of the $6.4 million CPCF Project. The agency withdrew $1 million for Office of Military Applications deferral late in FY '81. The total available for CPCF stood at $2.0 million at the end of the fiscal year.

FY 1982 Budget. The project was authorized an additional $3.4 million in FY '82 Budget (P.L. 97-45), and the same amount was appropriated (P.L. 97-45). The total available for CPCF now stood at $5.4 million.

Because of a General Reduction in FY '82 appropriations for Atomic Energy Defense Activities of $51 million, by mid-FY '82 the entire $5.4 million for CPCF had been withdrawn, and there were no funds available for CPCF.

FY 1984 Budget. We understand that $1.0 million is being carried in the FY '84 budget now under consideration to complete the original funding of the CPCF. DOE has identified methods of internally reprogramming funds to restore partial funding of the CPCF. These funds, however, are inadequate. It is, therefore, requested that the FY '84 Budget for the project be revised to $2.0 million to assure the agency's ability to complete construction of the CPCF.

MISCELLANEOUS ENVIRONMENTAL PROTECTION BRANCH WEEKLY REPORTS

ENVIRONMENTAL PROTECTION BRANCH

Weekly Activities Report
March 10, 1983

Sjoblom Visit - NESHAP

Gabe Marciante spent 60 hours this week in preparation of the Glen Sjoblom inspection/visit for March 10 and 11, reviewing presentations, rewriting slides, etc., etc., etc., etc. (Marciante)

NPDES

The State of Ohio's request for NPDES authority over Federal facilities was approved by U.S. EPA on January 28, 1983. Official notification was in the February 9, 1983, Federal Register, page 5918. The impacts that this will have on our Ohio facilities can not be guessed at this time as only future contacts will ascertain whether Ohio is more or less militant than the EPA was.

This will have a direct impact on engineering, however, as we must now seek Ohio's approval of plans for all projects which may impact on air and water.

Additionally, we are now subject to the Ohio permit fee structure. For water, this includes a $15 application fee, a $100 + 0.2% of project cost plan approval fee, and a fee ranging up to $750 per point source for permit issuance. (Travaglini)

Y-12 NPDES Compliance Inspection/Notice of Non-Compliance

The report by the State of Tennessee was as bad as expected. They have in effect said that they have jurisdiction over, that we need permits for, and that we should clean up or stop:

a. All discharges to EFPC above New Hope Pond
b. The Chestnut Ridge Sludge Basin and New Hope Pond sediments
c. S-3 pond and contaminants of Bear Creek
d. The Burial Ground Oil Pond
e. The Isolation area
f. Any Disposal Area/Burial Ground Practices which cause contamination of the groundwaters.

In addition, they have now formally requested the declassified report on mercury losses from Y-12 and pictures to document the areas they visited on their inspection. (Travaglini)

Leave/Travel

Wing - Sick leave, returning March 28.

Notice of Violation, Y-12 Bear Creek Sanitary Landfill (Received 2/22/83)

The Tennessee Division of Solid Waste Management (DSWM) issued a Notice of Violation (NOV) due to the continued use of the Bear Creek sanitary landfill. The NOV requires: (1)a closure plan for the Bear Creek landfill be submitted within 30 days; (2)disposal operations at the Bear Creek landfill cease within 60 days; and (3)closure activities must be implemented at the Bear Creek landfill within 60 days.

This NOV is the first step in a DSWM enforcement action. Failure to meet the stated deadlines may result in a "show cause" hearing before the State Board and the levying of a fine.

Discussions with Y-12 personnel indicate that the chances of meeting the second requirement are slim. An additional 30 days are anticipated to be required to close operations at the Bear Creek site. (Bird)

EPA Briefing, DOE Hazardous Waste Management

A presentation was made to EPA Headquarters on 2/17/83 describing DOE's hazardous waste management program. The briefing gave EPA a much better understanding as to how we handle our hazardous wastes. However, EPA's reaction to our suggestion for a memorandum of understanding concerning jurisdiction over AEA activities was mixed. EPA General Counsel's office disagrees with our interpretation of the exemption, stating that it is much too broad. The EPA Office of Federal Activities representative was supportive of our position. It does not appear that EPA will be concurring in writing with our position in the near future, particularly considering EPA's current internal problems. (Bird)

Leave/Travel

Wing - Sick leave, returning March 28.

Marciante - Sick leave, back part-time as of February 22.

gm 11/26
KCS
mw
GB

SAFETY & ENVIRONMENTAL CONTROL DIVISION
WEEKLY ACTIVITIES REPORT
November 26, 1982

State of Tennessee Press Release; Posting of East Fork Poplar Creek Due to Mercury in Fish Levels

In a press release of Tuesday, November 23, 1982, the Tennessee State Public Health Department announced that it would soon be posting warning signs along East Fork Poplar Creek advising against the consumption of fish taken from most of its 15 mile length. An Oak Ridge National Laboratory (ORNL) sampling and analysis of edible sport fish from the creek indicated that some fish had mercury concentrations in their edible portions of twice the US Food and Drug Administration's 1.0 ppm "Action Level," for mercury. The origin of the creek is a sedimentation and equalizing pond which receives discharges from the Y-12 Plant. State officials suspect that the source of the mercury contamination may be the result of a loss of approximately 50,000 pounds of elemental mercury from the Y-12 Plant on March 26, 1966. Despite the fact that the creek is little used, if at all, as a source of food fish, the State decided, after review of the ORNL data and ORO recommendations against posting, to proceed with posting. Dr. Robert F. Lash, noted Director of the East Tennessee Poison Control Center at the University of Tennessee's Memorial Hospital has indicated that there is little cause for concern about health problems with the levels of mercury detected by the ORNL study. He is quoted as saying, "In that concentration of methyl mercury, you would have to eat a lot of fish over a long period of time to have any problems." The State has indicated that it will be reviewing the situation further, and may prescribe remedial clean-up measures. (Marciante)

Staff Schedule

Davis - Health Protection Review, Middle Sex and Weldon Spring, 12/1-3/82

Love - IH Appraisal of Paducah - 11/29 - 12/4/82

T. 11/26
William H. Travis, Director
Safety & Environmental Control Division

8/4

ENVIRONMENTAL PROTECTION BRANCH
WEEKLY ACTIVITIES REPORT
August 2, 1978

Proposed Tennessee Regulations on Hazardous Waste Management

A copy of the proposed Tennessee Regulations on Hazardous Waste Management was received through UCCND and the Tennessee Manufacturers' Association (TMA) for information and comment. These proposed regulations, while patterned after the Resource Conservation and Recovery Act (RCRA), appear even more stringent than the drafts of RCRA sections dealing with hazardous waste. Our comments were conveyed to R. G. Jordan, who is attending a TMA meeting this week to discuss these regulations. If promulgated as they are now written, these regulations could have a very drastic economic, as well as procedural, impact on our Oak Ridge facilities, as well as all industry in Tennessee, in that, under these rules, essentially all wastes could be classified as hazardous. The procedures outlined to handle material classified as hazardous are very restrictive and detailed and the impact would be even greater than from any other environmental or occupational health regulations we have dealt with to date. (Love)

Poplar Creek Mercury Data

Two Division representatives met with Earl Leming, who is in charge of the Knoxville Office of the Tennessee Division of Water Quality Control to apprise him of the mercury data relative to Poplar Creek. Mr. Leming was given a set of the same information previously supplied to TVA, as well as a copy of the 1977 Oak Ridge Environmental Monitoring Report which discusses the data. He, like TVA, concluded the situation was not considered serious and certainly represented no threat to the public health and safety. (Wing/Alexander)

NPDES Quarterly Data Reports

Data for the second quarter has been received from all 8 permitted ORO facilities and is being assembled for transmittal to the EPA Regions. GAT had 30 violations during the quarter and NLO only 1. These facilities reported 16 violations to Region V EPA for the same period last year, 7 at Fernald and 9 at Portsmouth. Data received from ORGDP was late and incomplete. There were significantly fewer violations at the Region IV facilities than during the same period last year. (Alexander)

EPA Region V 308 Information Request at Portsmouth

The first package of material in response to Region V's May 22 request was mailed July 28. EPA had charged that ORO's permit modification requests for Portsmouth "were not consistent." In responding to this; i.e., resubmitting all previous requests, we noted that EPA does not appear to have all of our correspondence on this matter on file.* EPA had advised us to use the emerald shiner for the bioassay work, rather than the standard fat-head minnow test organism, and to have the work done on site rather than at Battelle's labs in Columbus. We have replied that we do not find either suggestion to be practical. (Alexander)

* Copies have been sent.

Environmental Protection Branch
Weekly Activities Report
December 3, 1981

Y-12

Environmental Management Critique

On December 1, J. M. Case and selected staff members were provided the conclusions of the appraisal. The main criticism is that Y-12 does not have an environmental management organization and that those individuals assigned to work in this area have insufficient authority to function effectively. The meeting went well and future Y-12/DOE discussions will be held to resolve the situation. (Staff)

Asbestos Problem at ORNL

A problem with asbestos removal occurred at the ORNL 3039 Stack Area improvement job being performed by Rust. Required procedures for asbestos removal were not followed, resulting in the unnecessary asbestos contamination of ~4000 gallons of rainwater in a ditch. Rust and DOE Engineering proposed pumping the water to White Oak Creek, which would have violated several environmental regulations. The contaminated water was finally discharged into the process waste system, allowing acceptable treatment. EP personnel made a site inspection of the problem (Bird)

Environmental Monitoring

A request for data was recently received from the Tennessee Department of Public Health, Division of Water Quality Control, in Knoxville, regarding mercury monitoring in Poplar Creek and the Clinch River. The request was not particularly noteworthy; however, what is interesting is that the requested data was included in the annual Environmental Monitoring Reports forwarded to that office each year. [You can send out the reports but you can't make them read them!] (Hickman)

UCCND/GAT Environmental Protection Meeting

EP Branch members attended a meeting chaired by Bob Jordan, UCCND. Items of interest included presentation of UCCND internal audit for environmental management, questions raised as to when new DOE Orders will be available for Carbide's consumption, and a status report on new assumptions for dose calculations. (Bird/Hickman/Travaglini)

Ft. Lewis Pilot Plant - Decommissioned Responsibilities

Marciante attended meetings at the FLPP site on November 23 and 24. Documentation of understandings reached among the Army, P&M Coal Mining Co., DOE, the State of Washington and the environmental consultant on site, has been drafted in the form of letters to the Army and the Washington State DOE. These are now circulating for concurrence and copies will be furnished to all involved when the documents have been signed. (Marciante/jd)

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RECENT SAMPLING ON MERCURY DOE RELEASES

U.S. DEPARTMENT OF ENERGY
P.O. BOX "E"
OAK RIDGE, TN 37830

SEP 12 1983

DOENEWS:

FOR IMMEDIATE RELEASE
SEPTEMBER 7, 1983

EDITOR'S NOTE:

Attached you will find additional results from DOE's environmental sampling program in Oak Ridge which have been provided separately to the Environmental Protection Agency, the State of Tennessee, the Tennessee Valley Authority and the City of Oak Ridge. The attachments reflect material forwarded by letters dated August 23, August 30 and September 6.

-DOE-

Attachments:

DOE transmittal letters dated, August 20, 23 and September 6.

Department of Energy
Oak Ridge Operations
P. O. Box E
Oak Ridge, Tennessee 37831

August 23, 1983

Those on Attached List

Gentlemen:

TRANSMITTAL OF ENVIRONMENTAL SAMPLING DATA FOR MERCURY

Additional mercury data has been generated for the Oak Ridge Area and is enclosed for your information and use.

Several soil core samples have been taken at Robertsville Junior High School to determine how mercury levels vary with depth. The analysis of three samples taken along the creek bank show elevated concentrations below the ground surface. A fourth sample taken near the former ANCO building had very low levels of mercury at each depth.

Three soil samples were taken on private property in Wiltshire Estates area within the floodplain about 40 meters from the creek.

If there are any questions related to this information, please contact me at (615) 576-1256 or (FTS) 626-1256.

Sincerely,

H Wayne Hibbitts

H. Wayne Hibbitts
Office of Assistant Manager
for Safety and Environment

SE-331:HWH

Enclosure:
As stated

cc w/encl:
Oak Ridge Library
R. B. Nicholas, Cong. Staff
J. V. Dugan, Cong. Staff
J. L. Leonard, TN/DHE

cc w/o encl:
H. D. Zeller, EPA-IV
T. K. Cothron, TN/DHE

Addressees - Letter dated August 23, 1983

SUBJECT: TRANSMITTAL OF ENVIRONMENTAL SAMPLING DATA FOR MERCURY

U.S. Environmental Protection Agency
Region IV
ATTN: Mr. Arthur G. Linton
Office of Asst. Regional Administrator
for Policy and Management
345 Courtland Street, N.E.
Atlanta, Georgia 30365

State of Tennessee
East Tennessee Regional Office
Department of Health and Environment
Division of Water Management
ATTN: Mr. Aubrey D. McKinney, Manager
Knoxville Basin Office
1522 Cherokee Trail
Knoxville, Tennessee 37920

City of Oak Ridge
ATTN: Mr. M. Lyle Lacy III
City Manager
Municipal Building
Oak Ridge, Tennessee 37830

Tennessee Valley Authority
ATTN: Mr. Jack Milligan
Water Quality Control Branch
401 Building
Chattanooga, Tennessee 37401

MERCURY

ENVIRONMENTAL MONITORING PROGRAM
OAK RIDGE ASSOCIATED UNIVERSITIES

August 18, 1983

Report Prepared By
Clayton S. Gist, Ecologist
ORAU-MERT-PTP

MERCURY DATA

Midway Commercial Area

Water (parts per billion)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Mitchell Rd. & Midway Lane	8/12/83	83-0327	.04 ppb

Sediment (parts per million)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Mitchell Rd. & Midway Lane	8/12/83	83-0328	.07 ppm

Soil (parts per million)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Mitchell Rd & Midway Lane	8/12/83	83-0329	0.11 ppm

MERCURY DATA

Robertsville Junior High Area

Soil (parts per million)

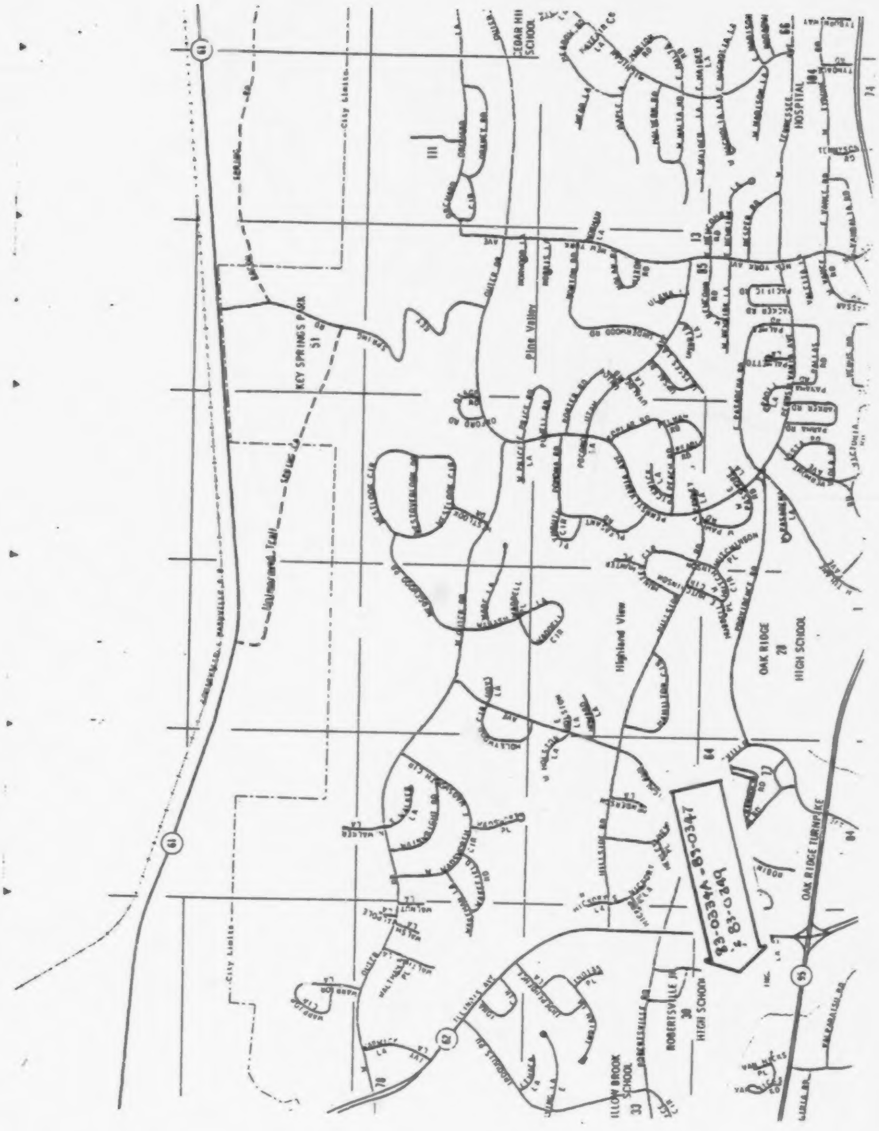
LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Robertsville Jr. High, Surface	8/16/83	83-0334A	74 ppm
Robertsville Jr. High, 3" Depth	8/16/83	83-0335	62 ppm
Robertsville Jr. High, 6" Depth	8/16/83	83-0336	51 ppm
Robertsville Jr. High, 9" Depth	8/16/83	83-0337	37.2 ppm
Robertsville Jr. High, Surface	8/16/83	83-0338	130 ppm
Robertsville Jr. High, 3" Depth	8/16/83	83-0339	210 ppm
Robertsville Jr. High, 6" Depth	8/16/83	83-0340	120 ppm
Robertsville Jr. High, 9" Depth	8/16/83	83-0341	61 ppm
Robertsville Jr. High, Surface	8/16/83	83-0342	25 ppm
Robertsville Jr. High, 3" Depth	8/16/83	83-0343	72 ppm
Robertsville Jr. High, 6" Depth	8/16/83	83-0344	102 ppm
Robertsville Jr. High, 9" Depth	8/16/83	83-0345	244 ppm
Robertsville Jr. High, Surface	8/16/83	83-0346	0.036 ppm
Robertsville Jr. High, 3" Depth	8/16/83	83-0347	0.02 ppm
Robertsville Jr. High, 9" Depth	8/16/83	83-0349	0.07 ppm

MERCURY DATA

Wiltshire Estates Area

Soil (parts per million)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Wiltshire Drive	8/15/83	83-0330	278 ppm
Wiltshire Drive	8/15/83	83-0331	18 ppm
Wiltshire Drive	8/15/83	83-0333	46 ppm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& 83-0349
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Pine Valley
Highland View
OAK RIDGE
28
HIGH SCHOOL
CEDAR HILL
SCHOOL
TENNESSEE
HOSPITAL
ROBERTSVILLE JR
30
HIGH SCHOOL
ILLOW BROOK
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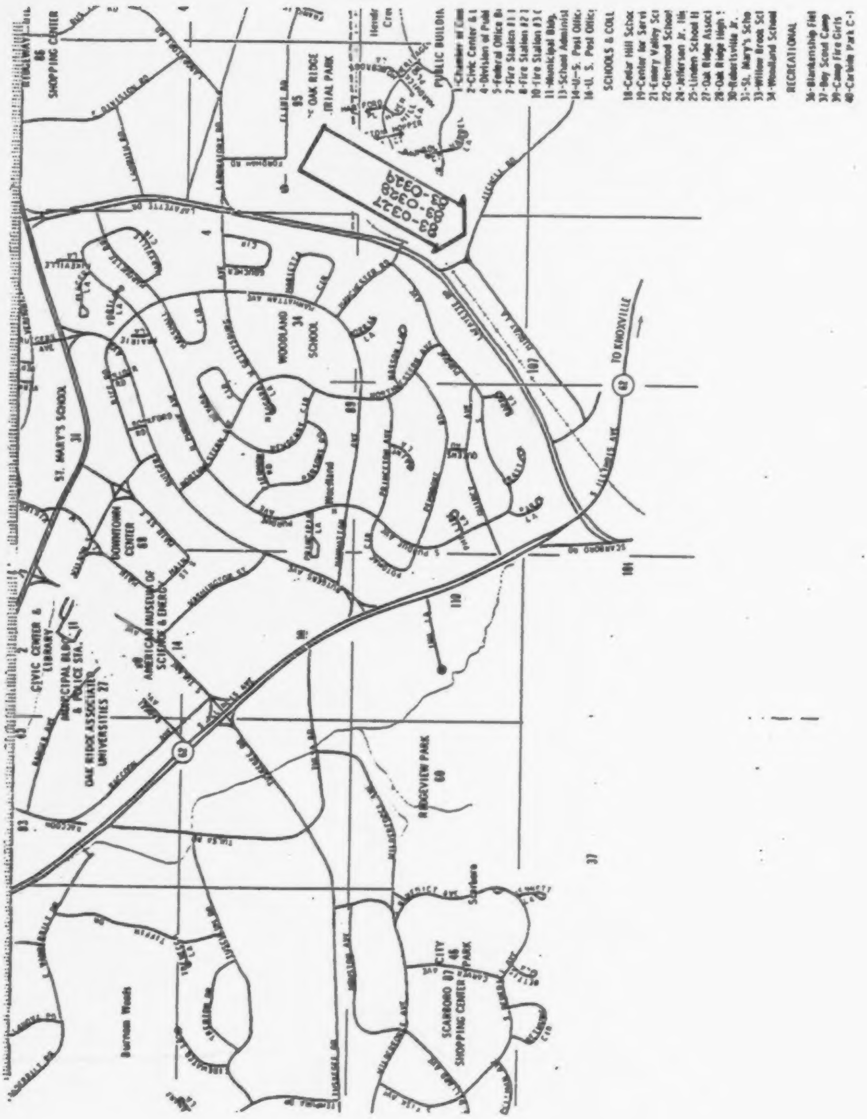
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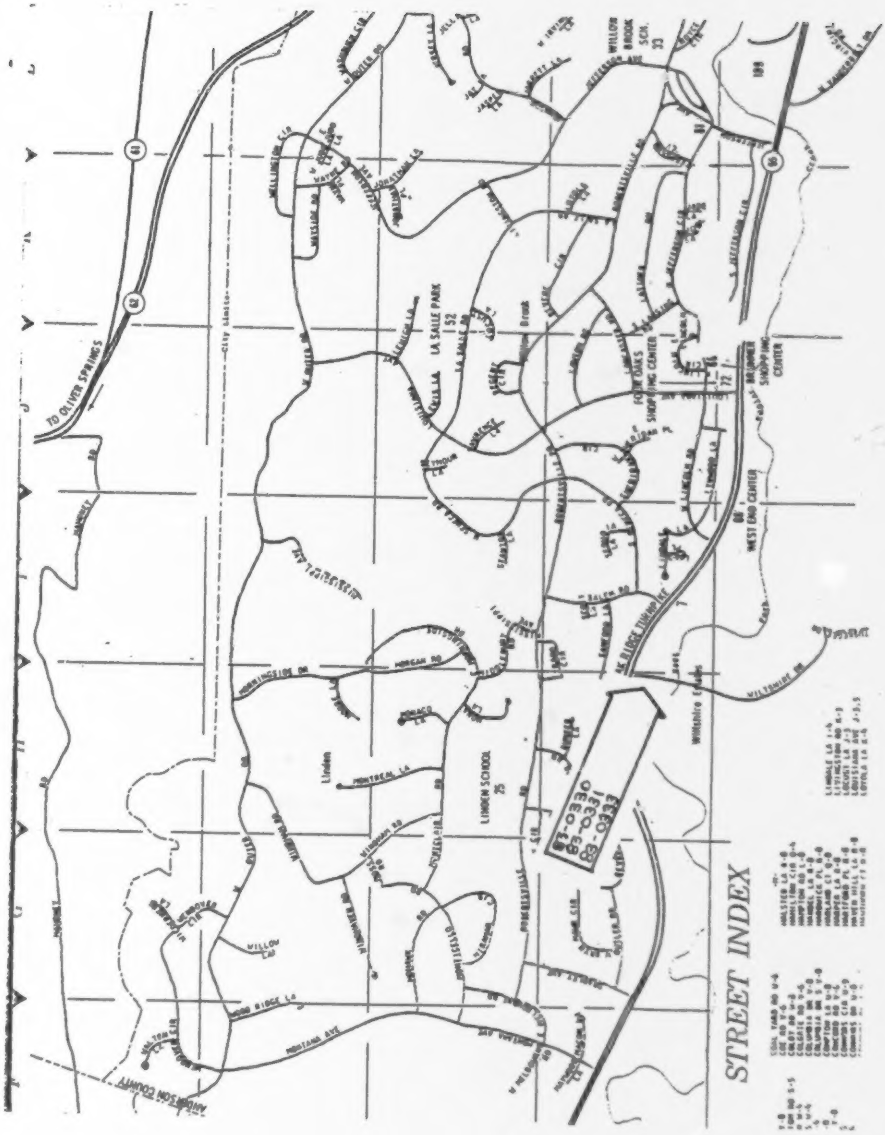
ST. MARY'S SCHOOL 31
DOWNTOWN CENTER
CIVIC CENTER & LIBRARY
MUNICIPAL BLDG. & POLICE STA.
AMERICAN MUSEUM OF SCIENCE & ENERGY
OAK RIDGE ASSOCIATED UNIVERSITIES 27
RIDGEVIEW PARK
TO KNOXVILLE
CITY PARK
SCARBORO SHOPPING CENTER
Scarboro
Burrows Woods
PUBLIC BUILDINGS
SCHOOLS & COLL
RECREATIONAL


TO OLIVER SPRINGS
61
62
City Limits
ANDERSON COUNTY
MONTANA AVE
WOOD RIDGE LA
WILLOW CIR
HANOVER CIR
OUTER DR
MORNINGSIDE DR
MORGAN RD
MONACO
MONTREAL LA
Linden
LINDEN SCHOOL
25
PORTLAND
LA SALLE PARK
152
LA SALLE RD
LEHIGH LA
W OUTER DR
WILLOW BROOK SCH.
33
JEFFERSON AVE
FOUR OAKS SHOPPING CENTER
BROWDER SHOPPING CENTER
72
WEST END CENTER
OAK RIDGE TURNPIKE
ILLINOIS AVE
WILTSHIRE DR
62
S JEFFERSON CIR
83-0330
83-0331
83-0333
STREET INDEX

Department of Energy
Oak Ridge Operations
P. O. Box E
Oak Ridge, Tennessee 37831

August 30, 1983

Those on Attached List

Gentlemen:

TRANSMITTAL OF ENVIRONMENTAL SAMPLING DATA FOR MERCURY

Additional mercury data has been generated for the Oak Ridge Area and is enclosed for your information and use.

In order to better understand the distribution of mercury levels at Robertsville Junior High School, a sampling grid was defined (the parenthetical listing of numbers following the entries "Robertsville Junior High" are the coordinates of this grid). Present plans call for application of 6 inches of top soil on those areas exceeding 3 ppm which are routinely used by students. Excluded would be the creek bank and an area close to the Oak Ridge Turnpike which is wooded with dense undergrowth. All of the data points exceeding 80 ppm are in this wooded area.

The Knoxville data is from the soil placed on the Jefferson Junior High School sewer line property.

If there are any questions related to this information, please contact me at (615) 576-1256 or (FTS) 626-1256.

Sincerely,

Wayne Hibbitts

H. Wayne Hibbitts
Office of Assistant Manager
for Safety and Environment

SE-331:HWH

Enclosure:
As stated

cc w/encl:
Oak Ridge Library
R. B. Nicholas, Cong. Staff
J. V. Dugan, Cong. Staff
J. L. Leonard, TN/DHE
Pat Turri, TN/DHE

cc w/o encl:
H. D. Zeller, EPA-IV
T. K. Cothron, TN/DHE

Addressees - Letter dated August 30, 1983

SUBJECT: TRANSMITTAL OF ENVIRONMENTAL SAMPLING DATA FOR MERCURY

U.S. Environmental Protection Agency
Region IV
ATTN: Mr. Arthur G. Linton
Office of Asst. Regional Administrator
for Policy and Management
345 Courtland Street, N.E.
Atlanta, Georgia 30365

State of Tennessee
East Tennessee Regional Office
Department of Health and Environment
Division of Water Management
ATTN: Mr. Aubrey D. McKinney, Manager
Knoxville Basin Office
1522 Cherokee Trail
Knoxville, Tennessee 37920

City of Oak Ridge
ATTN: Mr. M. Lyle Lacy III
City Manager
Municipal Building
Oak Ridge, Tennessee 37830

Tennessee Valley Authority
ATTN: Mr. Jack Milligan
Water Quality Control Branch
401 Building
Chattanooga, Tennessee 37401

MERCURY

ENVIRONMENTAL MONITORING PROGRAM
OAK RIDGE ASSOCIATED UNIVERSITIES

August 25, 1983

Report Prepared By
Clayton S. Gist, Ecologist
ORAU-MERT-PTP

MERCURY DATA

Robertsville Area

SOIL (parts per million)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Robertsville Jr. High (6" Depth)	8/16/83	83-0348	.08 ppm
Robertsville Jr. High (Surface)	8/16/83	83-0350	.18 ppm
Robertsville Jr. High (3" Depth)	8/16/83	83-0351	.11 ppm
Robertsville Jr. High (6" Depth)	8/16/83	83-0352	.12 ppm
Robertsville Jr. High (9" Depth)	8/16/83	83-0353	.07 ppm
Robertsville Jr. High (Surface)	8/16/83	83-0354	.53 ppm
Robertsville Jr. High (3" Depth)	8/16/83	83-0355	.23 ppm
Robertsville Jr. High (6" Depth)	8/16/83	83-0356	.10 ppm
Robertsville Jr. High (9" Depth)	8/16/83	83-0357	.04 ppm
Robertsville Jr. High (0,0)	8/20/83	83-0362	2.4 ppm
Robertsville Jr. High (0,10)	8/20/83	83-0363	3.5 ppm
Robertsville Jr. High (0,20)	8/20/83	83-0364	0.93ppm
Robertsville Jr. High (0,30)	8/20/83	83-0365	6.7 ppm
Robertsville Jr. High (0,40)	8/20/83	83-0366	1.5 ppm
Robertsville Jr. High (0,50)	8/20/83	83-0367	27 ppm
Robertsville Jr. High (0,60)	8/20/83	83-0368	27 ppm
Robertsville Jr. High (0,70)	8/20/83	83-0369	16 ppm
Robertsville Jr. High (0,80)	8/20/83	83-0370	4.6 ppm
Robertsville Jr. High (0,90)	8/20/83	83-0371	11 ppm
Robertsville Jr. High (0,100)	8/20/83	83-0372	2.6 ppm
Robertsville Jr. High (0,110)	8/20/83	83-0373	1.8 ppm
Robertsville Jr. High (0,120)	8/20/83	83-0374	8.5 ppm
Robertsville Jr. High (0,130)	8/20/83	83-0375	17 ppm
Robertsville Jr. High (0,140)	8/20/83	83-0376	28 ppm
Robertsville Jr. High (0,150)	8/20/83	83-0377	0.23 ppm
Robertsville Jr. High (20,120)	8/20/83	83-0378	2.0 ppm
Robertsville Jr. High (40,120)	8/20/83	83-0379	22 ppm
Robertsville Jr. High (60,120)	8/20/83	83-0380	0.090 ppm
Robertsville Jr. High (90,120)	8/20/83	83-0381	11 ppm
Robertsville Jr. High (110,120)	8/20/83	83-0382	7.1 ppm
Robertsville Jr. High (130,120)	8/20/83	83-0383	12 ppm
Robertsville Jr. High (150,120)	8/20/83	83-0384	17 ppm
Robertsville Jr. High (170,120)	8/20/83	83-0385	23 ppm
Robertsville Jr. High (190,120)	8/20/83	83-0386	12 ppm
Robertsville Jr. High (210,120)	8/20/83	83-0387	12 ppm
Robertsville Jr. High (230,120)	8/20/83	83-0388	8.6 ppm
Robertsville Jr. High (250,120)	8/20/83	83-0389	12 ppm
Robertsville Jr. High (270,120)	8/20/83	83-0390	1.7 ppm
Robertsville Jr. High (290,120)	8/20/83	83-0391	2.5 ppm
Robertsville Jr. High (310,120)	8/20/83	83-0392	12 ppm
Robertsville Jr. High (330,120)	8/20/83	83-0393	12 ppm
Robertsville Jr. High (0,160)	8/20/83	83-0394	0.85 ppm
Robertsville Jr. High (20,110)	8/21/83	83-0395	10 ppm
Robertsville Jr. High (40,110)	8/21/83	83-0396	14 ppm

MERCURY DATA

Robertsville Area

SOIL (parts per million)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Robertsville Jr. High (60,110)	8/21/83	83-0397	8.8 ppm
Robertsville Jr. High (80,110)	8/21/83	83-0398	24 ppm
Robertsville Jr. High (100,110)	8/21/83	83-0399	22 ppm
Robertsville Jr. High (120,110)	8/21/83	83-0400	26 ppm
Robertsville Jr. High (140,110)	8/21/83	83-0401	31 ppm
Robertsville Jr. High (160,110)	8/21/83	83-0402	47 ppm
Robertsville Jr. High (180,110)	8/21/83	83-0403	26 ppm
Robertsville Jr. High (200,110)	8/21/83	83-0404	17 ppm
Robertsville Jr. High (220,110)	8/23/83	83-0405	18 ppm
Robertsville Jr. High (240,110)	8/21/83	83-0406	13 ppm
Robertsville Jr. High (260,110)	8/23/83	83-0407	4 ppm
Robertsville Jr. High (280,110)	8/21/83	83-0408	0.85 ppm
Robertsville Jr. High (300,110)	8/21/83	83-0409	6.6 ppm
Robertsville Jr. High (320,110)	8/21/83	83-0410	11 ppm
Robertsville Jr. High (340,110)	8/21/83	83-0411	13 ppm
Robertsville Jr. High (360,110)	8/21/83	83-0412	7.5 ppm
Robertsville Jr. High (380,110)	8/21/83	83-0413	5.1 ppm
Robertsville Jr. High (390,110)	8/21/83	83-0414	6.3 ppm
Robertsville Jr. High (20,130)	8/21/83	83-0415	4 ppm
Robertsville Jr. High (40,130)	8/21/83	83-0416	7.3 ppm
Robertsville Jr. High (60,130)	8/21/83	83-0417	2.2 ppm
Robertsville Jr. High (80,130)	8/21/83	83-0418	0.4 ppm
Robertsville Jr. High (100,130)	8/21/83	83-0419	6.1 ppm
Robertsville Jr. High (120,130)	8/21/83	83-0420	0.25 ppm
Robertsville Jr. High (140,130)	8/21/83	83-0421	2.8 ppm
Robertsville Jr. High (160,130)	8/21/83	83-0422	6.6 ppm
Robertsville Jr. High (180,130)	8/21/83	83-0423	5.4 ppm
Robertsville Jr. High (200,130)	8/21/83	83-0424	1.0 ppm
Robertsville Jr. High (220,130)	8/21/83	83-0425	2.7 ppm
Robertsville Jr. High (240,130)	8/21/83	83-0426	3.1 ppm
Robertsville Jr. High (260,130)	8/21/83	83-0427	4.3 ppm
Robertsville Jr. High (280,130)	8/21/83	83-0428	3.5 ppm
Robertsville Jr. High (300,130)	8/21/83	83-0429	2.6 ppm
Robertsville Jr. High (320,130)	8/23/83	83-0430	5.2 ppm
Robertsville Jr. High (340,130)	8/21/83	83-0431	0.3 ppm
Robertsville Jr. High (20,140)	8/21/83	83-0432	26 ppm
Robertsville Jr. High (40,140)	8/21/83	83-0433	1.7 ppm
Robertsville Jr. High (60,140)	8/21/83	83-0434	26 ppm
Robertsville Jr. High (80,140)	8/21/83	83-0435	2.5 ppm
Robertsville Jr. High (100,140)	8/21/83	83-0436	0.75 ppm
Robertsville Jr. High (120,140)	8/21/83	83-0437	0.1 ppm
Robertsville Jr. High (140,140)	8/21/83	83-0438	0.03 ppm
Robertsville Jr. High (160,140)	8/21/83	83-0439	2.8 ppm
Robertsville Jr. High (180,140)	8/21/83	83-0440	2.7 ppm
Robertsville Jr. High (200,140)	8/21/83	83-0441	0.29 ppm
Robertsville Jr. High (220,140)	8/21/83	83-0442	1.1 ppm
Robertsville Jr. High (240,140)	8/21/83	83-0443	9.3 ppm
Robertsville Jr. High (260,140)	8/21/83	83-0444	0.98 ppm

MERCURY DATA

Robertsville Area

SOIL (parts per million)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Robertsville Jr. High (280,140)	8/21/83	83-0445	1.3 ppm
Robertsville Jr. High (300,140)	8/21/83	83-0446	1.4 ppm
Robertsville Jr. High (320,140)	8/21/83	83-0447	1.4 ppm
Robertsville Jr. High (340,140)	8/21/83	83-0448	0.26 ppm
Robertsville Jr. High (20,100)	8/23/83	83-0449	17 ppm
Robertsville Jr. High (40,100)	8/21/83	83-0450	0.4 ppm
Robertsville Jr. High (60,100)	8/21/83	83-0451	14 ppm
Robertsville Jr. High (80,100)	8/21/83	83-0452	17 ppm
Robertsville Jr. High (100,100)	8/21/83	83-0453	18 ppm
Robertsville Jr. High (120,100)	8/21/83	83-0454	15 ppm
Robertsville Jr. High (140,100)	8/21/83	83-0455	22 ppm
Robertsville Jr. High (160,100)	8/21/83	83-0456	12 ppm
Robertsville Jr. High (180,100)	8/21/83	83-0457	67 ppm
Robertsville Jr. High (200,100)	8/21/83	83-0458	5.3 ppm
Robertsville Jr. High (220,100)	8/21/83	83-0459	11 ppm
Robertsville Jr. High (240,100)	8/21/83	83-0460	14 ppm
Robertsville Jr. High (260,100)	8/21/83	83-0461	8.3 ppm
Robertsville Jr. High (280,100)	8/21/83	83-0462	5.1 ppm
Robertsville Jr. High (300,100)	8/21/83	83-0463	13 ppm
Robertsville Jr. High (320,100)	8/21/83	83-0464	13 ppm
Robertsville Jr. High (340,100)	8/21/83	83-0465	7.3 ppm
Robertsville Jr. High (360,100)	8/21/83	83-0466	4.2 ppm
Robertsville Jr. High (380,100)	8/21/83	83-0467	4.6 ppm
Robertsville Jr. High (390,100)	8/21/83	83-0468	17 ppm
Robertsville Jr. High (-40,100)	8/21/83	83-0469	0.78 ppm
Robertsville Jr. High (-20,100)	8/21/83	83-0470	3.6 ppm
Robertsville Jr. High (-50,90)	8/21/83	83-0471	0.06 ppm
Robertsville Jr. High (-40,90)	8/21/83	83-0472	0.7 ppm
Robertsville Jr. High (-20,90)	8/21/83	83-0473	3.3 ppm
Robertsville Jr. High (20,90)	8/21/83	83-0474	14 ppm
Robertsville Jr. High (40,90)	8/21/83	83-0475	7.3 ppm
Robertsville Jr. High (50,90)	8/21/83	83-0476	9.6 ppm
Robertsville Jr. High (-35,80)	8/21/83	83-0477	1.15 ppm
Robertsville Jr. High (-20,80)	8/21/83	83-0478	0.35 ppm
Robertsville Jr. High (20,80)	8/21/83	83-0479	1.2 ppm
Robertsville Jr. High (40,80)	8/21/83	83-0480	7.7 ppm
Robertsville Jr. High (48,80)	8/21/83	83-0481	18 ppm
Robertsville Jr. High (-30,70)	8/21/83	83-0482	3.6 ppm
Robertsville Jr. High (-20,70)	8/21/83	83-0483	9.6 ppm
Robertsville Jr. High (20,70)	8/21/83	83-0484	8.3 ppm
Robertsville Jr. High (40,70)	8/21/83	83-0485	26 ppm
Robertsville Jr. High (-29,60)	8/21/83	83-0486	14 ppm
Robertsville Jr. High (-20,60)	8/21/83	83-0487	33 ppm
Robertsville Jr. High (20,60)	8/21/83	83-0488	2.2 ppm
Robertsville Jr. High (36,60)	8/21/83	83-0489	62 ppm
Robertsville Jr. High (-28,50)	8/21/83	83-0490	346 ppm
Robertsville Jr. High (-20,50)	8/21/83	83-0491	39 ppm
Robertsville Jr. High (20,50)	8/21/83	83-0492	10 ppm

MERCURY DATA

Robertsville Area

SOIL (parts per million)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Robertsville Jr. High (35,50)	8/21/83	83-0493	12 ppm
Robertsville Jr. High (-33,40)	8/21/83	83-0494	216 ppm
Robertsville Jr. High (-20,40)	8/21/83	83-0495	18 ppm
Robertsville Jr. High (20,40)	8/21/83	83-0496	19 ppm
Robertsville Jr. High (30,40)	8/21/83	83-0497	25 ppm
Robertsville Jr. High (-40,30)	8/21/83	83-0498	327 ppm
Robertsville Jr. High (-20,30)	8/21/83	83-0499	337 ppm
Robertsville Jr. High (23,30)	8/21/83	83-0500	12 ppm
Robertsville Jr. High (-40,20)	8/21/83	83-0501	337 ppm
Robertsville Jr. High (-20,40)	8/21/83	83-0502	49 ppm
Robertsville Jr. High (-50,10)	8/21/83	83-0503	42 ppm
Robertsville Jr. High (-20,10)	8/21/83	83-0504	254 ppm
Robertsville Jr. High (-15,0)	8/21/83	83-0505	1.1 ppm
Robertsville Jr. High (310,160)	8/23/83	83-0516	0.65 ppm
Robertsville Jr. High (310,170)	8/23/83	83-0517	0.10 ppm
Robertsville Jr. High (310,180)	8/23/83	83-0518	0.85 ppm
Robertsville Jr. High (310,190)	8/23/83	83-0519	0.7 ppm
Robertsville Jr. High (310,200)	8/23/83	83-0520	0.05 ppm
Robertsville Jr. High (300,160)	8/23/83	83-0521	0.08 ppm
Robertsville Jr. High (300,170)	8/23/83	83-0522	0.1 ppm
Robertsville Jr. High (300,180)	8/23/83	83-0523	0.65 ppm
Robertsville Jr. High (300,190)	8/23/83	83-0524	0.46 ppm
Robertsville Jr. High (300,200)	8/23/83	83-0525	0.27 ppm
Robertsville Jr. High (20,150)	8/23/83	83-0526	33 ppm
Robertsville Jr. High (40,150)	8/23/83	83-0527	4.67 ppm
Robertsville Jr. High (60,150)	8/23/83	83-0528	8 ppm
Robertsville Jr. High (80,150)	8/23/83	83-0529	4.8 ppm
Robertsville Jr. High (100,150)	8/23/83	83-0530	0.43 ppm
Robertsville Jr. High (120,150)	8/23/83	83-0531	0.22 ppm
Robertsville Jr. High (140,150)	8/23/83	83-0532	0.23 ppm
Robertsville Jr. High (160,150)	8/23/83	83-0533	3.8 ppm
Robertsville Jr. High (180,150)	8/23/83	83-0534	2.2 ppm
Robertsville Jr. High (200,150)	8/23/83	83-0535	0.65 ppm
Robertsville Jr. High (220,150)	8/23/83	83-0536	0.38 ppm
Robertsville Jr. High (240,150)	8/23/83	83-0537	0.52 ppm

MERCURY DATA

Knoxville Area

SOIL (parts per million)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
behind TEC on Pellissippi	8/23/83	83-0506	0.08 ppm
behind TEC on Pellissippi	8/23/83	83-0507	0.05 ppm
behind TEC on Pellissippi	8/23/83	83-0508	0.1 ppm
behind TEC on Pellissippi	8/23/83	83-0509	0.1 ppm
behind TEC on Pellissippi	8/23/83	83-0510	0.1 ppm
behind TEC on Pellissippi	8/23/83	83-0511	0.09 ppm
behind TEC on Pellissippi	8/23/83	83-0512	0.09 ppm
behind TEC on Pellissippi	8/23/83	83-0513	0.07 ppm
behind TEC on Pellissippi	8/23/83	83-0514	0.11 ppm
behind TEC on Pellissippi	8/23/83	83-0515	0.09 ppm

MERCURY DATA

Wiltshire Estates

VEGETATION (parts per million)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Wiltshire Drive [1]	8/13/83	83-0332	<0.02 ppm

[1] Tomatoes were taken from plants growing in soil containing 18 ppm mercury (Sample No. 83-0331).

MERCURY DATA

Atmospheric Turbulence and Diffusion Laboratory (ATDL) Area

SOIL (parts per million)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
ATDL Floodplain (Surface)	8/18/83	83-0358	38 ppm
ATDL Floodplain (3" Depth)	8/18/83	83-0359	66 ppm
ATDL Floodplain (6" Depth)	8/18/83	83-0360	60 ppm
ATDL Floodplain (9" Depth)	8/18/83	83-0361	54 ppm

Department of Energy
Oak Ridge Operations
P. O. Box E
Oak Ridge, Tennessee 37831

September 6, 1983

Those on Attached List

TRANSMITTAL OF ENVIRONMENTAL SAMPLING DATA FOR MERCURY AND POLYCHLORINATED BIPHENYLS

Additional mercury, as well as polychlorinated byphenyls (PCBs), data has been generated for the Oak Ridge Area and is enclosed for your information and use.

Mercury levels in surface soil at Robertsville Junior High School were obtained to aid in delineating areas which will be covered with clean topsoil.

The following PCB standards are listed as an aid to those recipients of this data desiring benchmarks for comparison.

EPA Water	0.0015 ppm
FDA Fish	2.0 ppm
EPA Soil	50.0 ppm

If there are any questions related to this information, please contact me at (615) 576-1256 or (FTS) 626-1256.

Sincerely,

H Wayne Hibbitts

H. Wayne Hibbitts
Office of Assistant Manager
for Safety and Environment

SE-331:HWH

Enclosure:
As stated

cc w/encl:
Oak Ridge Library
R. B. Nicholas, Cong. Staff
J. V. Dugan, Cong. Staff
J. L. Leonard, TN/DHE
Pat Turri, TN/DHE

cc w/o encl:
H. D. Zeller, EPA-IV
T. K. Cothron, TN/DHE

Addressees - Letter dated September 6, 1983

SUBJECT: TRANSMITTAL OF ENVIRONMENTAL SAMPLING DATA FOR MERCURY

U.S. Environmental Protection Agency
Region IV
ATTN: Mr. Arthur G. Linton
Office of Asst. Regional Administrator
for Policy and Management
345 Courtland Street, N.E.
Atlanta, Georgia 30365

State of Tennessee
East Tennessee Regional Office
Department of Health and Environment
Division of Water Management
ATTN: Mr. Aubrey D. McKinney, Manager
Knoxville Basin Office
1522 Cherokee Trail
Knoxville, Tennessee 37920

City of Oak Ridge
ATTN: Mr. M. Lyle Lacy III
City Manager
Municipal Building
Oak Ridge, Tennessee 37830

Tennessee Valley Authority
ATTN: Mr. Jack Milligan
Water Quality Control Branch
401 Building
Chattanooga, Tennessee 37401

MERCURY

ENVIRONMENTAL MONITORING PROGRAM
OAK RIDGE ASSOCIATED UNIVERSITIES

September 1, 1983

Report Prepared By
Clayton S. Gist, Ecologist
ORAU-MERT-PTP

MERCURY DATA

Robertsville Area

SOIL (parts per million)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Robertsville Jr. High (50,150)	8/28/83	83-0546	1.3 ppm
Robertsville Jr. High (50,170)	8/28/83	83-0547	6.5 ppm
Robertsville Jr. High (50,190)	8/28/83	83-0548	3.3 ppm
Robertsville Jr. High (50,200)	8/28/83	83-0549	6.2 ppm
Robertsville Jr. High (70,220)	8/28/83	83-0550	0.44 ppm
Robertsville Jr. High (70,200)	8/28/83	83-0551	0.04 ppm
Robertsville Jr. High (70,190)	8/28/83	83-0552	1.04 ppm
Robertsville Jr. High (70,170)	8/28/83	83-0553	0.42 ppm
Robertsville Jr. High (70,150)	8/28/83	83-0554	23 ppm
Robertsville Jr. High (90,150)	8/28/83	83-0555	1.2 ppm
Robertsville Jr. High (90,170)	8/28/83	83-0556	1.4 ppm
Robertsville Jr. High (90,190)	8/28/83	83-0557	1.1 ppm
Robertsville Jr. High (90,200)	8/28/83	83-0558	1.3 ppm

PCB DATA

SOIL (parts per million)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Indian Creek Floodplain, Oliver Springs	8/1/83	83-0308	<0.1 ppm
Indian Creek Floodplain, Oliver Springs	8/1/83	83-0309	<0.1 ppm
Coak Creek Floodplain, Lake City	8/1/83	83-0312	<0.1 ppm
Coak Creek Floodplain, Lake City	8/1/83	83-0313	<0.1 ppm
Town Creek Floodplain, Lenoir City	8/1/83	83-0316	0.1 ppm
Town Creek Floodplain, Lenoir City	8/1/83	83-0317	<0.1 ppm

SEDIMENT (parts per million)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Indian Creek, Oliver Springs	8/1/83	83-0307	<0.1 ppm
Coal Creek, Lake City	8/1/83	83-0311	<0.1 ppm
Town Creek, Lenoir City	8/1/83	83-0315	0.3 ppm

SEWAGE SLUDGE (parts per million)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
New Sewage Plant, Oak Ridge	7/26/83	83-0295	0.3 ppm
Old Sewage Plant, West Oak Ridge	7/26/83	83-0296	0.2 ppm
Lenoir City Sewage Plant	7/26/83	83-0297	2.0 ppm
Old Sewage Plant, East Oak Ridge	7/26/83	83-0299	0.3 ppm
Kuwaha Sewage Plant, Knoxville	8/2/83	83-0321	0.2 ppm

WATER (parts per million)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Coal Creek, Lake City	8/1/83	83-0310	<0.0005 ppm
Town Creek, Lenoir City	8/1/83	83-0314	<0.0005 ppm
Indian Creek, Oliver Springs	8/2/83	83-0320	<0.0005 ppm

U.S. DEPARTMENT OF ENERGY
P.O. BOX "E"
OAK RIDGE, TN 37830

DOENEWS:

FOR IMMEDIATE RELEA
August 17, 1983

AUG 19 1983

EDITOR'S NOTE:

Attached you will find additional results from DOE's environmental program in Oak Ridge which have been provided separately to the Environmental Protection Agency, the State of Tennessee, the Tennessee Valley Authority and the City of Oak Ridge. This material reflects material fowarded by letters of August 10 and August 16, 1983.

-DOE-

Attachment:
DOE transmittal letters, dated August 10 and August 16, 1983.

Subcomm

Department of Energy
Oak Ridge Operations
P.O. Box E
Oak Ridge, Tennessee 37830

August 10, 1983

Those on Attached List

Gentlemen:

TRANSMITTAL OF ENVIRONMENTAL SAMPLING DATA FOR MERCURY

Additional mercury data has been generated for the Oak Ridge Area and is enclosed for your information and use.

The garden listed with above background mercury levels will be resampled and vegetables will be collected for analysis.

If there are any questions related to this information, please contact me at (615) 576-1256 or (FTS) 626-1256.

Sincerely,

Wayne Hibbitts

H. Wayne Hibbitts
Office of Assistant Manager
for Safety and Environment

SE-331:HWH

Enclosure:
As stated

cc w/encl:
Oak Ridge Library
R. B. Nicholas, Cong. Staff
J. V. Dugan, Cong. Staff
J. L. Leonard, TN/DHE

cc w/o encl:
H. D. Zeller, EPA-IV
T. K. Cothron, TN/DHE

Addressees - Letter dated August 10, 1983

SUBJECT: TRANSMITTAL OF ENVIRONMENTAL SAMPLING DATA FOR MERCURY

U.S. Environmental Protection Agency
Region IV
ATTN: Mr. Arthur G. Linton
Office of Asst. Regional Administrator
for Policy and Management
345 Courtland Street, N.E.
Atlanta, Georgia 30365

State of Tennessee
East Tennessee Regional Office
Department of Health and Environment
Division of Water Management
ATTN: Mr. Aubrey D. McKinney, Manager
Knoxville Basin Office
1522 Cherokee Trail
Knoxville, Tennessee 37920

City of Oak Ridge
ATTN: Mr. M. Lyle Lacy III
City Manager
Municipal Building
Oak Ridge, Tennessee 37830

Tennessee Valley Authority
ATTN: Mr. Jack Milligan
Water Quality Control Branch
401 Building
Chattanooga, Tennessee 37401

MERCURY DATA

Fairbanks Road

SOIL (parts per million)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Jefferson Jr. High, yard soil	07/28/83	83-0300	240 ppm
Jefferson Jr. High, yard soil	07/28/83	83-0301	285 ppm

MERCURY DATA

Robertsville Area

SOIL (parts per million)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Robertsville Jr. High, yard soil	07-28-83	83-0303	0.11 ppm
Robertsville Jr. High, yard soil	07-28-83	83-0304	22 ppm
East Fork Poplar Creek, yard soil (Robertsville Jr. High)	07-28-83	83-0305	17 ppm
N. LaSalle Road, garden soil	08-02-83	83-0318	12 ppm
N. LaSalle Road, garden soil	08-02-83	83-0319	76 ppm

MERCURY DATA

Scarboro Area

SOIL (parts per million)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
East Fork Poplar Creek, floodplain	07-28-83	83-0302	220 ppm

VEGETATION (parts per million)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
ATDL Weather Station (blackberry fruit and stem)	07-11-83	83-0250[1]	<.002 ppm
ATDL Weather Station (blackberry fruit and stem)	07-11-83	83-0252[2]	<.002 ppm

[1] Corresponds to soil sample 83-0251, 4.2 ppm

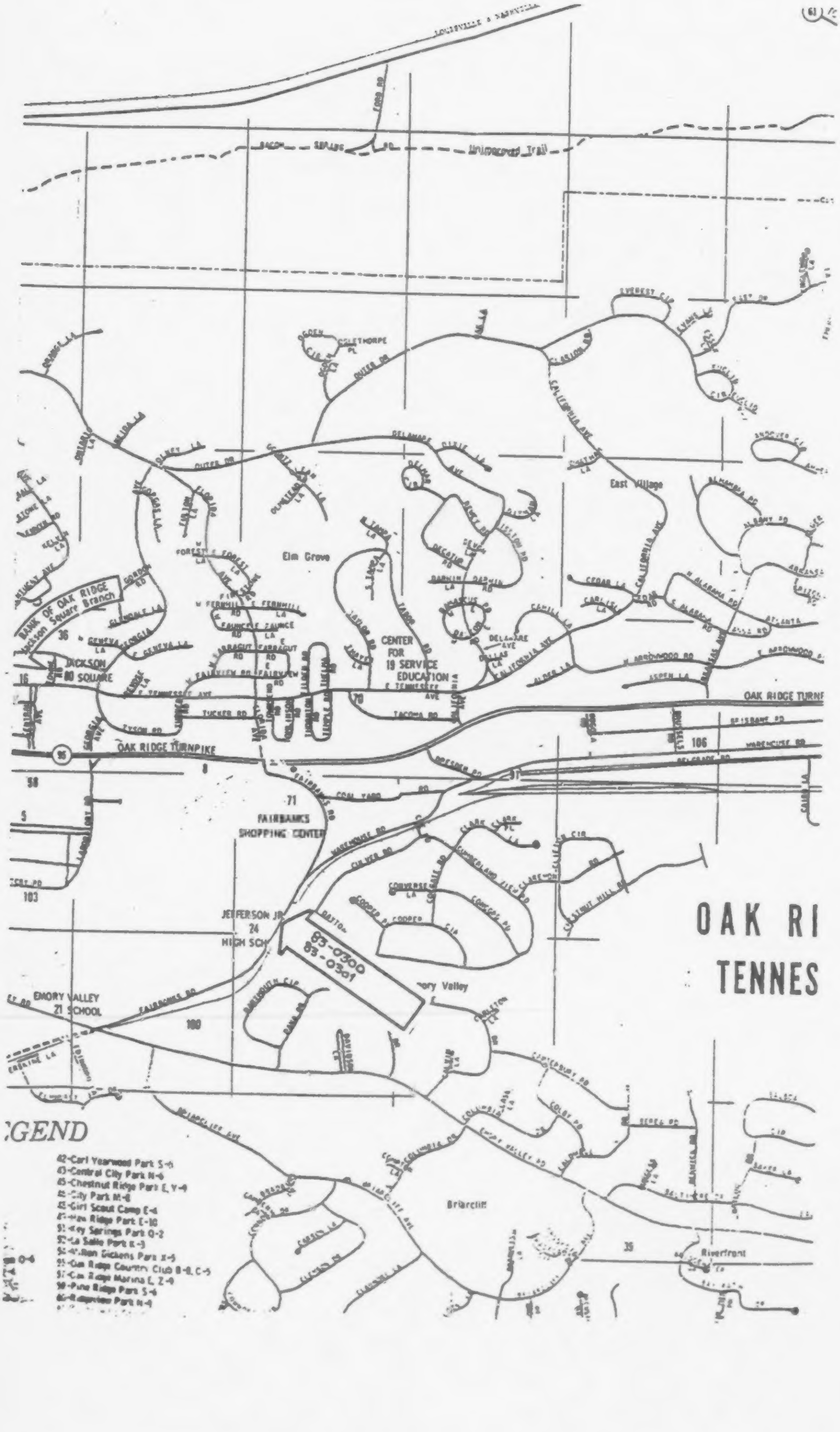
[2] Corresponds to soil sample 83-0253, 2.3 ppm

MERCURY DATA

Background

WATER (parts per billion)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Poplar Creek (Near Oliver Springs)	08-01-83	83-0306	<.05 ppb
Coal Creek (Lake City)	08-01-83	83-0310	<.05 ppb
Town Creek (Lenior City)	08-01-83	83-0314	<.05 ppb
Poplar Creek (Near Oliver Springs High School)	08-02-83	83-0320	.05 ppb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Unimproved Trail
East Village
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Jackson Square Branch
JACKSON
SQUARE
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FOR
SERVICE
EDUCATION
OAK RIDGE TURNPIKE
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SCHOOL
Briarcliff
Riverfront
OAK RI
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43-Central City Park N-6
45-Chestnut Ridge Park E, Y-9
-City Park M-6
-Girl Scout Camp E-4
-Haw Ridge Park E-10
-Key Springs Park O-2
-La Salle Park K-3
-Alan Gickens Park X-5
-Oak Ridge Country Club B-8, C-5
-Oak Ridge Marina E, Z-9
-Pine Ridge Park S-4
-Ridgeview Park N-4

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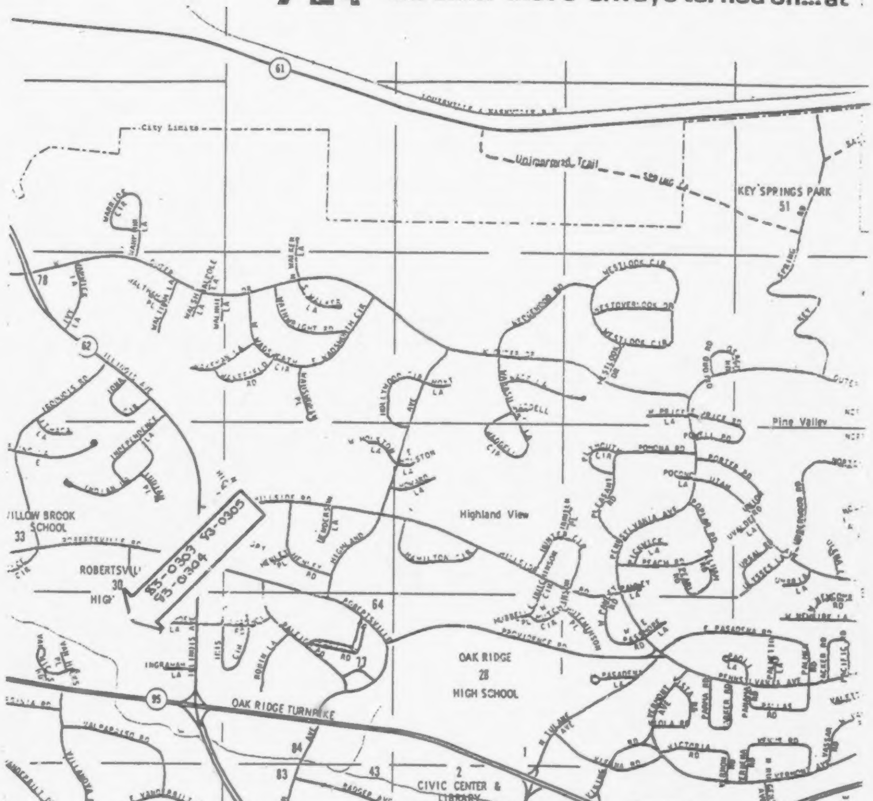
61
City Limits
Unimproved Trail
SPRING LA
KEY SPRINGS PARK
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78
62
Pine Valley
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WILLOW BROOK SCHOOL
33
ROBERTSVILLE
30
HIGH
83-0303
83-0305
83-0304
64
OAK RIDGE
28
HIGH SCHOOL
95
OAK RIDGE TURNPIKE
84
83
43
2
CIVIC CENTER & LIBRARY
MUNICIPAL BLDG. & POLICE STA.
OAK RIDGE ASSOCIATED UNIVERSITIES 27
ST. MARY'S SCHOOL
31
DOWNTOWN CENTER
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AMERICAN MUSEUM OF SCIENCE & ENERGY
14
Burnam Woods
WOODLAND
34
SCHOOL
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89
10
RIDGEVIEW PARK
60
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SHOPPING CENTER
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83-0252
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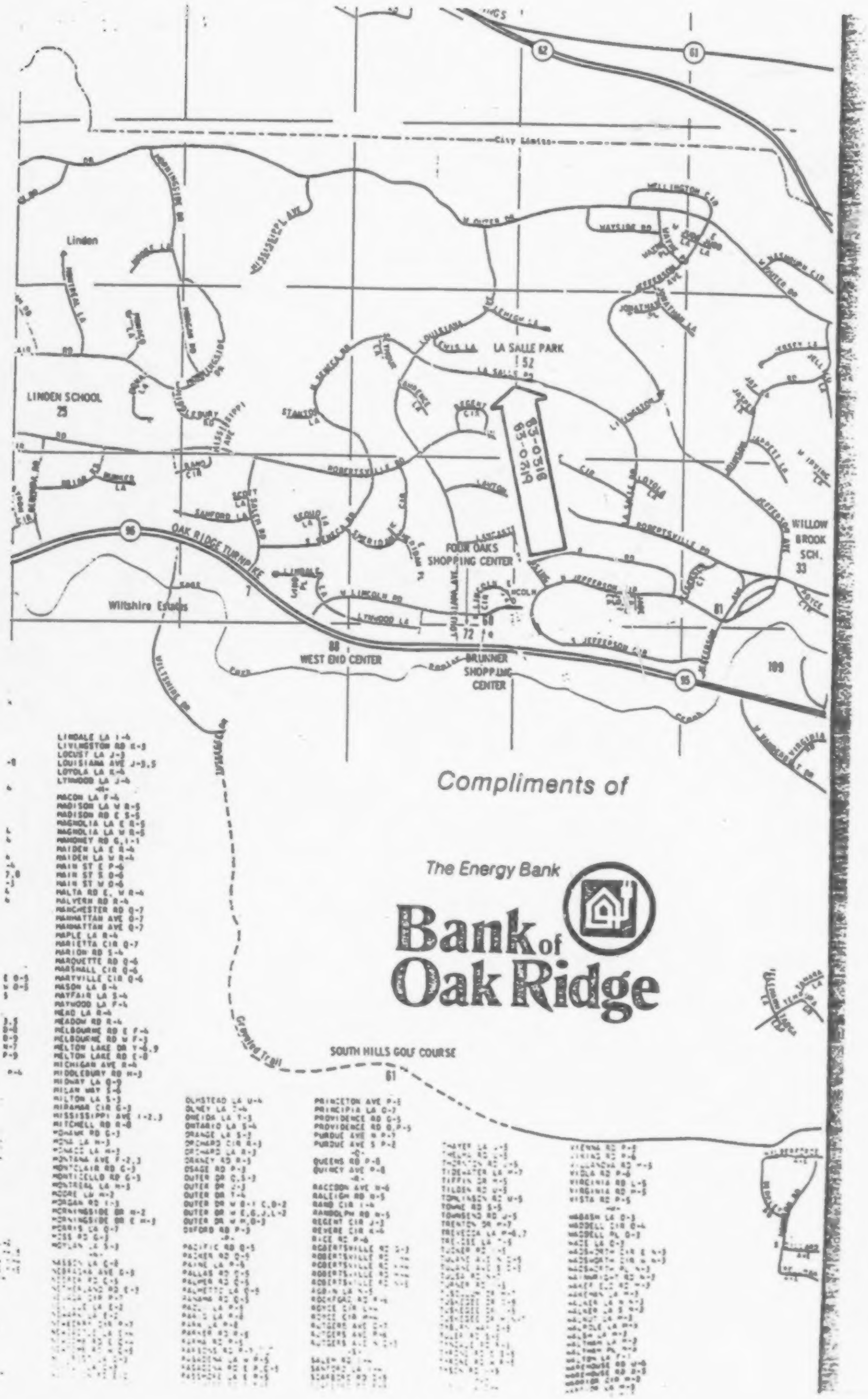
107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Wiltshire Estates
7
88
WEST END CENTER
72
68
BRUNNER SHOPPING CENTER
81
109
95
WILTSHIRE DR
VIRGINIA RD
Greenbelt Trail
SOUTH HILLS GOLF COURSE
61
83-0318
93-0214

LINDALE LA I-4
LIVINGSTON RD K-5
LOCUST LA J-3
LOUISIANA AVE J-3,5
LOYOLA LA K-4
LYNWOOD LA J-4
-M-
MACON LA F-4
MADISON LA W R-5
MADISON RD E S-5
MAGNOLIA LA E R-5
MAGNOLIA LA W R-5
MAHONEY RD G,I-1
MAIDEN LA E R-4
MAIDEN LA W R-4
MAIN ST E P-6
MAIN ST S O-6
MAIN ST W O-6
MALTA RD E, W R-4
MALVERN RD R-4
MANCHESTER RD Q-7
MANHATTAN AVE O-7
MANHATTAN AVE Q-7
MAPLE LA R-4
MARIETTA CIR Q-7
MARION RD S-4
MARQUETTE RD Q-6
MARSHALL CIR Q-6
MARYVILLE CIR Q-6
MASON LA R-4
MAYFAIR LA S-4
MAYWOOD LA F-4
MEAD LA R-4
MEADOW RD R-4
MELBOURNE RD E F-4
MELBOURNE RD W F-3
MELTON LAKE DR Y-6,9
MELTON LAKE RD E-8
MICHIGAN AVE R-4
MIDDLEBURY RD H-3
MIDWAY LA Q-9
MILAN WAY S-6
MILTON LA S-3
MIRAMAR CIR G-3
MISSISSIPPI AVE I-2,3
MITCHELL RD R-8
MOHAWK RD G-3
MONA LA H-3
MONACO LA H-3
MONTANA AVE F-2,3
MONTCLAIR RD G-3
MONTICELLO RD G-3
MONTREAL LA H-3
MOORE LN H-3
MORGAN RD I-3
MORNINGSIDE DR H-2
MORNINGSIDE DR E H-3
MORRIS LA G-7
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ONEIDA LA T-3
ONTARIO LA S-4
ORANGE LA S-3
ORCHARD CIR R-3
ORCHARD LA R-3
ORANEY RD R-3
OSAGE RD P-3
OUTER DR C,S-3
OUTER DR J-3
OUTER DR T-4
OUTER DR W B-I C,D-2
OUTER DR W E,G,J,L-2
OUTER DR W M,O-3
OXFORD RD P-3
-P-
PACIFIC RD Q-5
PARKER RD Q-5
PAINE LA P-5
PALLAS RD C-5
PALMER RD C-5
PALMETTO LA S-5
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PASADENA RD E P,S-5
PASSMORE LA E P-5
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PRINCETON AVE P-5
PRINCIPIA LA Q-7
PROVIDENCE RD G-5
PROVIDENCE RD O,P-5
PURDUE AVE N P-7
PURDUE AVE S P-2
-Q-
QUEENS RD P-8
QUINCY AVE P-8
-R-
RACCOON AVE N-6
RALEIGH RD N-5
RAND CIR I-4
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REGENT CIR J-3
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RICE RD P-6
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THAYER LA J-5
THOMAS RD J-5
THORNTON RD J-5
TIDEWATER LA M-7
TIFFIN DR M-5
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VISTA RD P-5
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WADDELL CIR O-4
WADDELL PL O-3
WADE LA O-3
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WADSWORTH CIR W N-3
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Compliments of

The Energy Bank

Bank of Oak Ridge

Department of Energy
Oak Ridge Operations
P. O. Box E
Oak Ridge, Tennessee 37831

August 16, 1983

Those on Attached List

Gentlemen:

TRANSMITTAL OF ENVIRONMENTAL SAMPLING DATA FOR MERCURY

Additional mercury data has been generated for the Oak Ridge area and is enclosed for your information and use.

As projected in the previous submittal, the North LaSalle garden soil was again sampled and produce analyzed; unfortunately, only mint was available.

Sewage sludge data previously reported for Sample Numbers 83-0296, 83-0297, and 83-0299 have been revised to be on a dry weight basis.

If there are any questions relating to this information, please contact me at (615) 576-1256 or (FTS) 626-1256.

Sincerely,

H Wayne Hibbitts

H. Wayne Hibbitts
Office of Assistant Manager
for Safety and Environment

SE-331:HWH

Enclosure:
As stated

cc w/encl:
Oak Ridge Library
R. B. Nicholas, Cong. Staff
J. V. Dugan, Cong. Staff
J. L. Leonard, TN/DHE

cc w/o encl:
H. D. Zeller, EPA-IV
T. K. Cothron, TN/DHE

Addressees - Letter dated August 16, 1983

SUBJECT: TRANSMITTAL OF ENVIRONMENTAL SAMPLING DATA FOR MERCURY

U.S. Environmental Protection Agency
Region IV
ATTN: Mr. Arthur G. Linton
Office of Asst. Regional Administrator
for Policy and Management
345 Courtland Street, N.E.
Atlanta, Georgia 30365

State of Tennessee
East Tennessee Regional Office
Department of Health and Environment
Division of Water Management
ATTN: Mr. Aubrey D. McKinney, Manager
Knoxville Basin Office
1522 Cherokee Trail
Knoxville, Tennessee 37920

City of Oak Ridge
ATTN: Mr. M. Lyle Lacy III
City Manager
Municipal Building
Oak Ridge, Tennessee 37830

Tennessee Valley Authority
ATTN: Mr. Jack Milligan
Water Quality Control Branch
401 Building
Chattanooga, Tennessee 37401

MERCURY

ENVIRONMENTAL MONITORING PROGRAM
OAK RIDGE ASSOCIATED UNIVERSITIES

August 11, 1983

Report Prepared By
Geoffrey Gleason, Radiochemist
ORAU-MERT-PTP

MERCURY DATA

Scarboro Area

SOIL (parts per million)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Bethune Circle, yard soil	8/5/83	83-0322	.05 ppm
Bethune Circle, garden soil	8/5/83	83-0323	.04 ppm

MERCURY DATA

Fairbanks Road Area

SLUDGE (parts per million)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Old Sewage Treatment Plant, dry sludge	07/26/83	83-0299	13 ppm

MERCURY DATA

Linden School Area

SOIL (parts per million)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
N. LaSalle, garden soil	8/5/83	83-0325	29 ppm

VEGETATION (parts per million)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
N. LaSalle, mint plant	8/5/83	83-0324	.16 ppm

MERCURY DATA

Wiltshire Estates Area

SLUDGE (parts per million)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Waste Water Treatment Plant, dry sludge	07/26/83	83-0295	15 ppm
Old Sewage Treatment Plant, dry sludge	07/26/83	83-0296	22 ppm

MERCURY DATA

Oliver Springs Area

SOIL (parts per million)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Poplar Creek (near Oliver Springs High School), stream bank	8/1/83	83-0308	0.02 ppm
Poplar Creek (near Oliver Springs High School), flood plain	8/1/83	83-0309	0.04 ppm

SEDIMENT (parts per million)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Poplar Creek (near Oliver Springs High School)	8/1/83	83-0307	.01 ppm

MERCURY DATA

Lake City Area

SOIL (parts per million)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Coal Creek (Lake City Creek), stream bank	8/1/83	83-0312	0.04 ppm
Coal Creek (Lake City Creek), flood plain	8/1/83	83-0313	0.06 ppm

SEDIMENT (parts per million)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Coal Creek (Lake City Creek)	8/1/83	83-0311	.01 ppm

MERCURY DATA

Knoxville Area

SLUDGE (parts per million)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Kuwahee Sewage Plant, sludge	07/26/83	83-0298	1.8 ppm
Kuwahee Sewage Plant, sludge	08/02/83	83-0321	1.6 ppm

MERCURY DATA

Lenoir City Area

SOIL (parts per million)

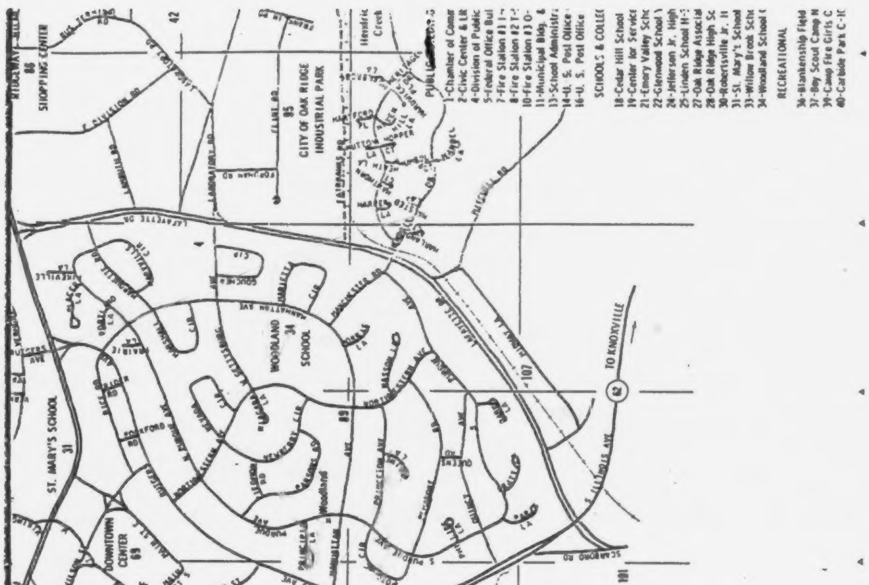
LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Town Creek (Nelson St.), stream bank	08/01/83	83-0316	.09 ppm
Town Creek (Nelson St.), stream bank	08/01/83	83-0317	.16 ppm

SEDIMENT (parts per million)

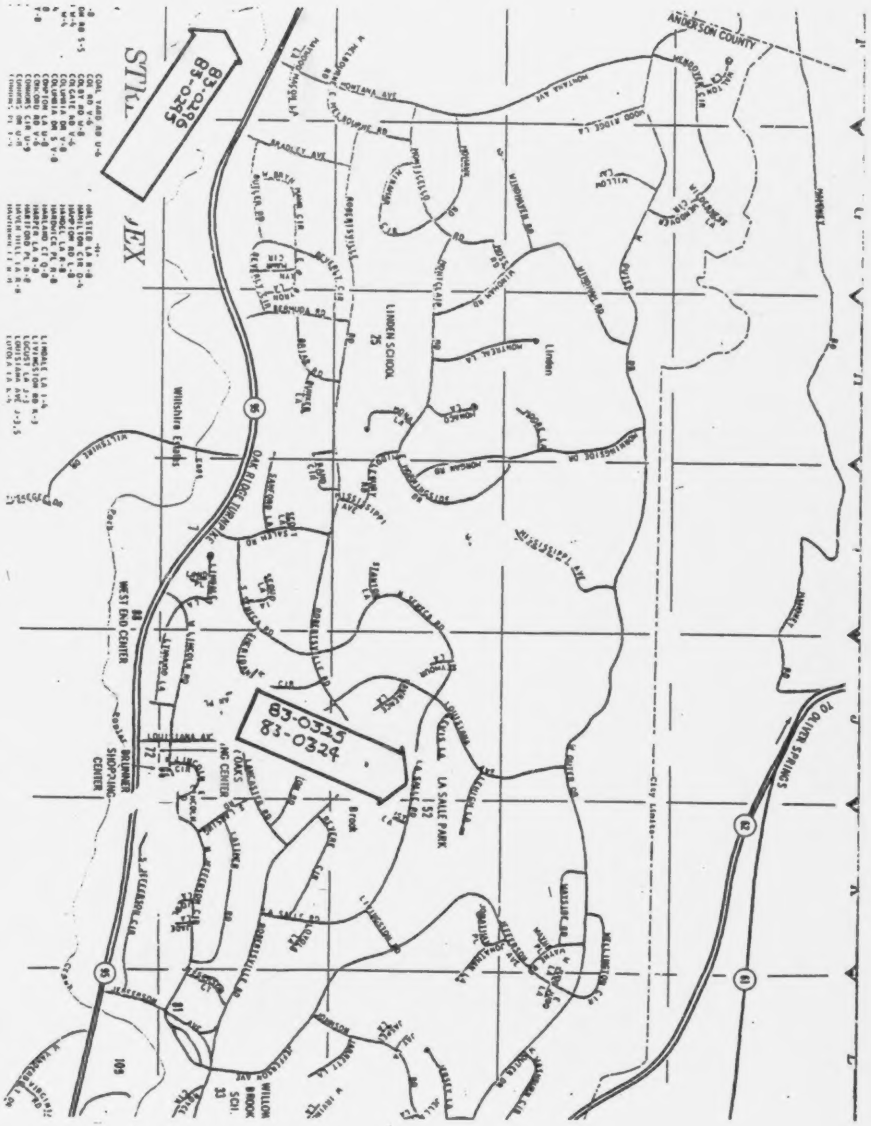
LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Town Creek (Nelson St.)	08/01/83	83-0315	.12 ppm

SLUDGE (parts per million)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
Lenoir City Sewage Plant, dry sludge	07/26/83	83-0297	6.6 ppm


RIDGEWAY SHOPPING CENTER
ST. MARY'S SCHOOL 31
CIVIC CENTER & LIBRARY 2
MUNICIPAL BLDG. & POLICE STA. 11
OAK RIDGE ASSOCIATED UNIVERSITIES 27
AMERICAN MUSEUM OF SCIENCE & ENERGY
DOWNTOWN CENTER
WOODLAND 34 SCHOOL
CITY OF OAK RIDGE INDUSTRIAL PARK
RIDGEVIEW PARK
SCARBORO SHOPPING CENTER
CITY PARK
Burnham Woods
TO KNOXVILLE
PUBLIC
1-Chamber of Comm
2-Civic Center & Lib
4-Division of Public
5-Federal Office Bui
7-Fire Station #1
8-Fire Station #2
10-Fire Station #3
11-Municipal Bldg. &
13-School Administr
14-U. S. Post Office
16-U. S. Post Office
SCHOOLS & COLLEG
18-Cedar Hill School
19-Center for Service
21-Emory Valley Scho
22-Glenwood School
24-Jefferson Jr. High
25-Linden School
27-Oak Ridge Associat
28-Oak Ridge High Sc
30-Robertsville Jr. H
31-St. Mary's School
33-Willow Brook Scho
34-Woodland School
RECREATIONAL
36-Blankenship Field
37-Boy Scout Camp
39-Camp Fire Girls C
40-Carbide Park C

83-0322
83-0323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25
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OAK RIDGE TURNPIKE
WEST END CENTER
BRUNNER SHOPPING CENTER
TO OLIVER SPRINGS
WILLOW BROOK SCH.
33
Wiltshire Estates
City Limits
MONTANA AVE
MISSISSIPPI AVE
LOUISIANA AVE
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95
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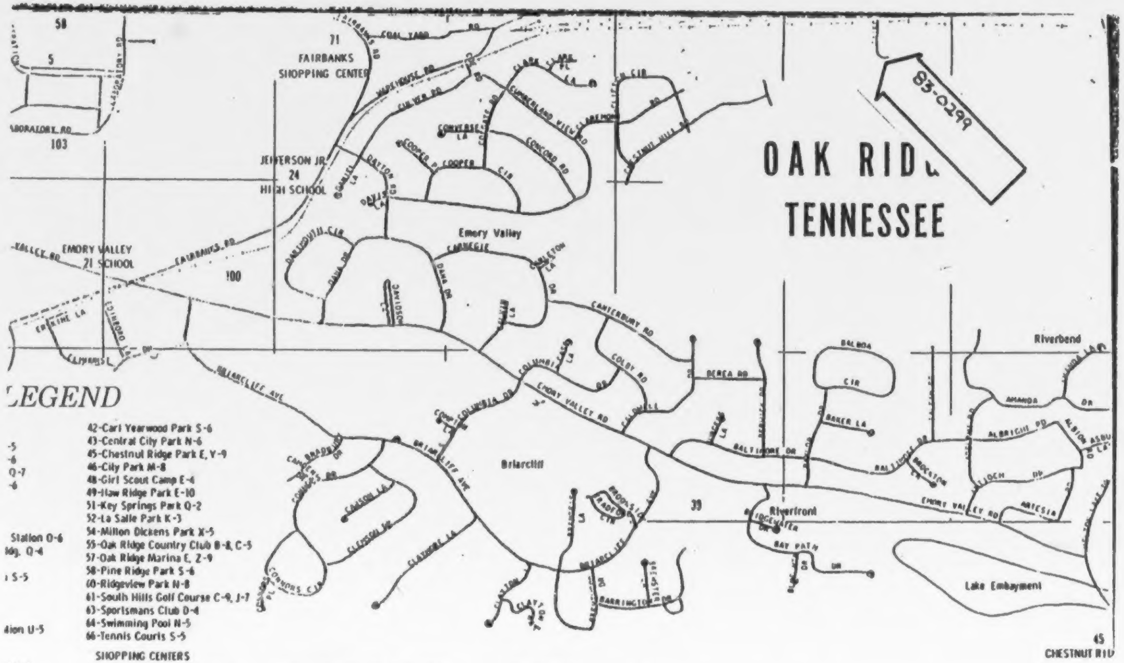
INDEX

83-0299


OAK RID
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FAIRBANKS SHOPPING CENTER
71
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LABORATORY RD
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24
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21
100
Emory Valley
Briarcliff
39
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CHESTNUT RID
COAL YARD RD
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COLBY RD
COLUMBIA DR
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AMANDA DR
ALBRIGHT RD
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LEGEND

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42-Carl Yearwood Park S-6
43-Central City Park N-6
45-Chestnut Ridge Park E, Y-9
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48-Girl Scout Camp E-4
49-Haw Ridge Park E-10
51-Key Springs Park Q-2
52-La Salle Park K-3
54-Milton Dickens Park X-5
55-Oak Ridge Country Club B-8, C-5
57-Oak Ridge Marina E, Z-9
58-Pine Ridge Park S-6
60-Ridgeview Park N-8
61-South Hills Golf Course C-9, J-7
63-Sportsmans Club D-4
64-Swimming Pool N-5
66-Tennis Courts S-5

SHOPPING CENTERS

68-Brunner Shopping Center J-4
69-Downtown Center P-6
70-Elm Grove Shopping Center U-5
71-Fairbanks Shopping Center U-6
72-Four Oaks Shopping Center J-5
74-French Plaza R-5
77-Grove Shopping Center N-5
78-Hilltop Shopping Center M-3
80-Jackson Square S-5
81-Jefferson Shopping Center L-4
83-King Shopping Center N-6
84-Lizz Shopping Center N-5
85-Pine Valley Shopping Center O-4
86-Ridgeway Shopping Center R-6
87-Scarboro Shopping Center M-8
88-West End Center I-5
89-Woodland Shopping Center P-7

MISCELLANEOUS

90-American Museum of Science & Energy O-6
91-Animal Shelter V-5
92-Army Reserve Y-5
94-Bull Run Steam Plant E-9
95-City of Oak Ridge Industrial Park R-7
97-Clinch River Industrial Park A-9
98-East Sewage Treatment Plant X-6
100-Elks Lodge T-7
101-Filtration Plant O-9
103-Heliport S-6
104-Hospital R-5
106-Main Warehouse Area W-5
107-Midway Commercial Area Q-9
109-National Guard Armory L-5
110-Nuclear Studies O-8
111-Reservoir R-3
U. S. Dept. of Energy
K25 Area A-8, 9
X10 Area B-9
Y12 Area C-9
112-Valley Industrial Park D-9
113-West Sewage Treatment Plant E-4

Department of Energy
Oak Ridge Operations
P. O. Box E
Oak Ridge, Tennessee 37831

September 20, 1983

Those on Attached List

Gentlemen:

TRANSMITTAL OF ENVIRONMENTAL SAMPLING DATA FOR MERCURY

Additional mercury data has been generated for the Oak Ridge Area and is enclosed for your information and use.

If there are any questions related to this information, please contact me at (615) 576-1256 or (FTS) 626-1256.

Sincerely,

H Wayne Hibbitts
H. Wayne Hibbitts
Office of Assistant Manager
for Safety and Environment

SE-331:HWH

Enclosure:
As stated

cc w/encl:
Oak Ridge Library
R. B. Nicholas, Cong. Staff
J. V. Dugan, Cong. Staff
J. L. Leonard, TN/DHE
Pat Turri, TN/DHE

cc w/o encl:
H. D. Zeller, EPA-IV
T. K. Cothron, TN/DHE

Addressees - Letter dated September 20, 1983

SUBJECT: TRANSMITTAL OF ENVIRONMENTAL SAMPLING DATA FOR MERCURY

U.S. Environmental Protection Agency
Region IV
ATTN: Mr. Arthur G. Linton
Office of Asst. Regional Administrator
for Policy and Management
345 Courtland Street, N.E.
Atlanta, Georgia 30365

State of Tennessee
East Tennessee Regional Office
Department of Health and Environment
Division of Water Management
ATTN: Mr. Aubrey D. McKinney, Manager
Knoxville Basin Office
1522 Cherokee Trail
Knoxville, Tennessee 37920

City of Oak Ridge
ATTN: Mr. M. Lyle Lacy III
City Manager
Municipal Building
Oak Ridge, Tennessee 37830

Tennessee Valley Authority
ATTN: Mr. Jack Milligan
Water Quality Control Branch
401 Building
Chattanooga, Tennessee 37401

MERCURY

ENVIRONMENTAL MONITORING PROGRAM
OAK RIDGE ASSOCIATED UNIVERSITIES

September 15, 1983

Report Prepared By
Clayton S. Gist, Ecologist
ORAU-MERT-PTP

MERCURY DATA

Fairbanks Road

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
SOIL (parts per million)			
Jefferson Jr. High	8/24/83	83-0543	418 ppm
Jefferson Jr. High	8/24/83	83-0544	.5 ppm
Jefferson Jr. High	8/24/83	83-0545	208 ppm
Jefferson Jr. High	8/24/83	83-0565	276 ppm
Jefferson Jr. High	8/24/83	83-0566	216 ppm
Jefferson Jr. High	8/24/83	83-0567	97 ppm
Jefferson Jr. High	8/24/83	83-0568	396 ppm
Jefferson Jr. High	8/24/83	83-0569	436 ppm
Jefferson Jr. High	8/24/83	83-0570	304 ppm
Culver Road	9/13/83	83-0587	11.4 ppm
Culver Road	9/13/83	83-0588	1.2 ppm
Culver Road	9/13/83	83-0591	1.0 ppm
SEDIMENT (parts per million)			
Culver Road*	9/13/83	83-0589	116 ppm
Culver Road*	9/13/83	83-0590	23.6 ppm

*These two samples came from two residences separated by a drainage ditch. This ditch drains the front portion of Jefferson Junior High School.

September 14, 1983

MERCURY DATA

Robertsville

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
SOIL (parts per million)			
Robertsville Jr. High (500,100)	9/13/83	83-0577	3.48 ppm
Robertsville Jr. High (480,100)	9/13/83	83-0578	7.4 ppm
Robertsville Jr. High (460,100)	9/13/83	83-0579	4.6 ppm
Robertsville Jr. High (440,100)	9/13/83	83-0580	21 ppm
Robertsville Jr. High (420,100)	9/13/83	83-0581	.57 ppm
Robertsville Jr. High (400,100)	9/13/83	83-0582	5.9 ppm

September 14, 1983

MERCURY DATA

Scarboro

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
SOIL (parts per million)			
South Dillard Ave., garden	9/13/83	83-0584	.114 ppm
South Dillard Ave., garden	9/13/83	83-0586	.16 ppm

September 14, 1983

MERCURY DATA

High School

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
VEGETATION (parts per billion)			
Hollywood Circle, Canned Green Beans	7/6/83	83-0212	3.0 ppb
Hollywood Circle, Canned Green Beans	7/6/83	83-0213	10 ppb

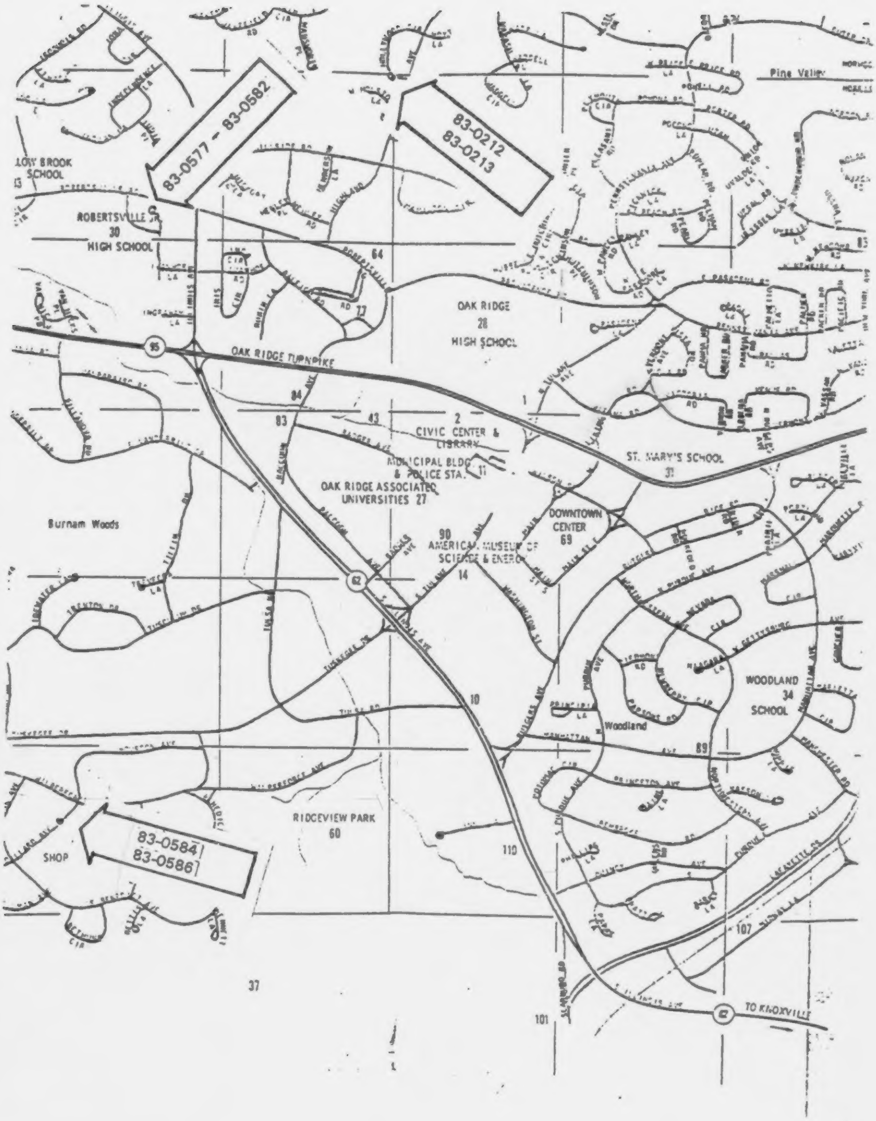
September 14, 1983

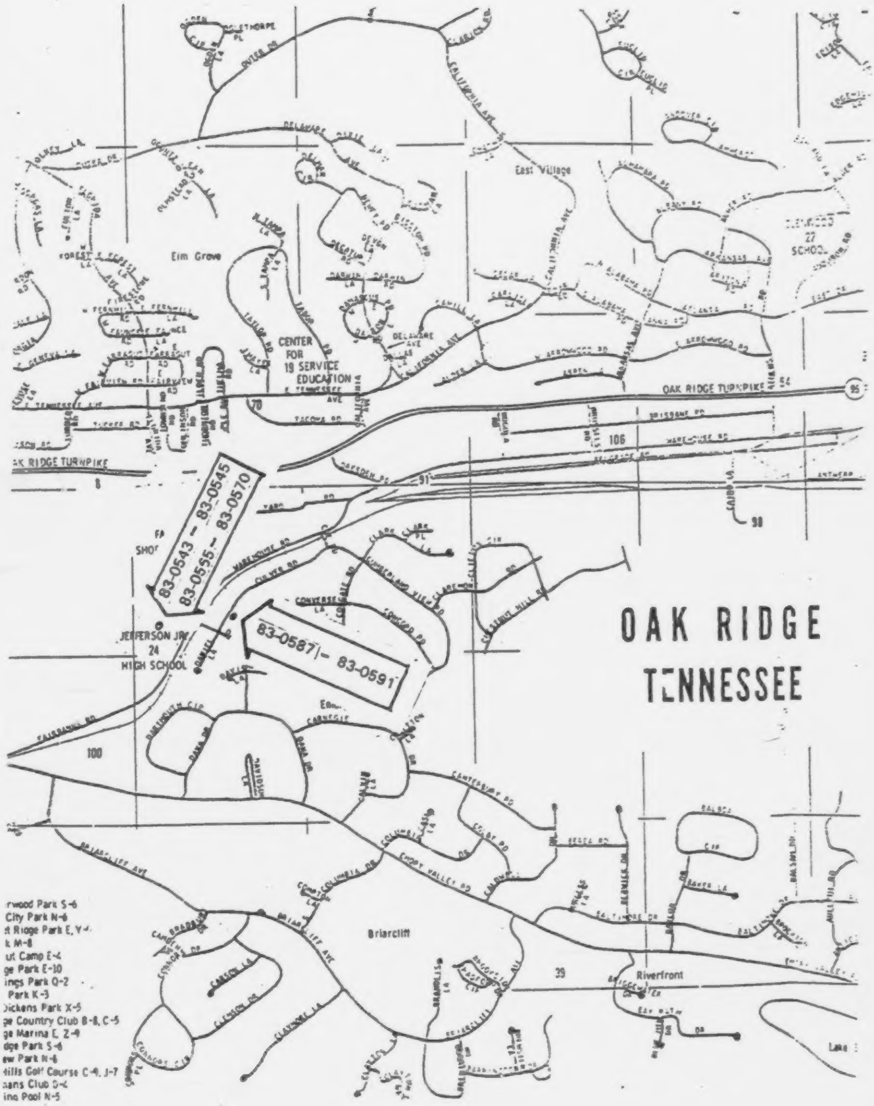
MERCURY DATA

Outside of City

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
SOIL (parts per million)			
Alexandria, VA	7/83	83-0571	.2 ppm
Oklahoma City	7/83	83-0572	.27 ppm
Boulder, Colorado	7/83	83-0573	.16 ppm
Nevada	7/83	83-0574	.08 ppm
Utah	7/83	83-0575	.04 ppm
Oklahoma City	7/83	83-0576	.18 ppm

September 14, 1983


83-0577 – 83-0582
83-0212
83-0213
Pine Valley
LOW BROOK
SCHOOL
ROBERTSVILLE JR.
30
HIGH SCHOOL
64
77
OAK RIDGE
28
HIGH SCHOOL
95
OAK RIDGE TURNPIKE
84
83
43
2
1
CIVIC CENTER &
LIBRARY
MUNICIPAL BLDG
& POLICE STA.
11
OAK RIDGE ASSOCIATED
UNIVERSITIES 27
ST. MARY'S SCHOOL
31
DOWNTOWN
CENTER
69
Burnam Woods
90
AMERICAN MUSEUM OF
SCIENCE & ENERGY
14
62
10
WOODLAND
34
SCHOOL
Woodland
89
RIDGEVIEW PARK
60
SHOP
83-0584
83-0586
110
107
37
101
TO KNOXVILLE


OAK RIDGE
TENNESSEE
83-0543 – 83-0545
83-0555 – 83-0570
83-0587 – 83-0591
OAK RIDGE TURNPIKE
East Village
Elm Grove
CENTER FOR SERVICE EDUCATION
19
JEFFERSON JR. HIGH SCHOOL
24
GLENWOOD SCHOOL
27
Briarcliff
Riverfront
106
100
39
95
91
98
70
8
DELAWARE AVE
CALIFORNIA AVE
E TENNESSEE AVE
BRIARCLIFF AVE
CANTERBURY RD
CARNEGIE
CONVERSE
CULVER RD
WAREHOUSE RD
DRESDEN RD
BRISBANE RD
WAREHOUSE RD
OUTER DR
OGLETHORPE PL
Lake
rwood Park S-6
City Park N-6
t Ridge Park E, Y-4
k M-8
ut Camp E-4
ge Park E-10
ings Park O-2
Park K-3
Dickens Park X-5
ge Country Club B-8, C-5
ge Marina E, Z-9
dge Park S-6
ew Park N-6
Hills Golf Course C-9, J-7
ans Club D-4
ing Pool N-5

DOCUMENTS PERTAINING TO DOE'S RCRA AND CERCLA EXEMPTIONS CLAIMS

file
8 RCRA

Department of Energy
Oak Ridge Operations
P.O. Box E
Oak Ridge, Tennessee 37830

August 28, 1980

Files

RCRA REGULATION OF ATOMIC ENERGY ACT MATERIALS

The issue to which this memorandum is directed concerns the definition of source, special nuclear, by-product material and other radioactive material as it relates to the United States Environmental Protection Agency's (EPA's) implementation of the Resource Conservation and Recovery Act (RCRA) (Public Law 94-480). The U. S. Department of Energy (DOE) Oak Ridge Operations (ORO) takes the position that the Atomic Energy Act of 1954, as amended (42 U.S.C. § 2011 et seq.), and other applicable law, defines the material in a manner which includes not only Atomic Energy Act (AEA) material radionuclides, but the entire mixture of materials which is generated by one of our processes which contains source, special nuclear, by-product material, or other radioactive material.

In a typical waste or process stream, some chemicals deemed hazardous by the RCRA are introduced and become co-contaminated with AEA and non-AEA regulated radioactive materials. At question is whether any or all the wastes are affected by RCRA and the EPA implementing regulations.

I. REGULATION OF SOURCE, SPECIAL NUCLEAR AND BY-PRODUCT MATERIAL

The Atomic Energy Act of 1946 (formerly 42 U.S.C. §§ 1801 - 1819) was first passed to assure the common defense, security and supremacy of the United States in the atomic energy field. It also established the Atomic Energy Commission (AEC) and gave it unprecedented powers and control with respect to the production, distribution and acquisition of fissionable materials, the taking of ownership of production facilities and materials, the licensing of manufacturers to use atomic energy for non-military purposes, the making of atomic bombs, and the release of information and patents. Subsequently, the Atomic Energy Act of 1954 was enacted with the primary purpose of bringing the original Act of 1946 into accord with atomic progress and to make legislative controls better conform with currently existing scientific, technical, economic and political facts of atomic energy by improving procedures for the control and dissemination of atomic energy information and encouraging

RCRA
(2. b.) Haz. W

broadened participation by private industry in the development of peacetime uses of atomic energy, although at the same time making all of these programs subject to the objective of providing for the common defense and security of the United States. (1954 U.S. Code Congr. & Ad. News 3457).

The legal basis for this legislation is found in the various constitutional powers of Congress (see 1954 U.S. Code Congr. & Admin. News, Pg. 3465), including, among others, the powers to provide for the common defense (U. S. Constitution Article I, Section 8, Clause 1.), to raise and support armies (U. S. Constitution Article I, Section 8, Clause 12.), to provide and maintain a navy (U. S. Constitution Article I, Section 8, Clause 13.), and to regulate commerce with foreign nations and among the several states (U. S. Constitution Article I, Section 8, Clause 3.).

The powers granted to the Atomic Energy Commission by the statutory provisions prescribing the general duties of the Commission include authority to issue rules and regulations governing the possession and use of nuclear material (42 U.S.C. § 2201 (b)), to prevent the loss or diversion of any nuclear materials acquired or produced pursuant to the Act and to govern any authorized activity in order to protect health and minimize danger to life and property (42 U.S.C. § 2201(i)), to dispose of radioactive materials in the interest of national security (42 U.S.C. § 2201(j)), to require licensees to keep records and to make reports and to provide for the inspection of licensed activities (42 U.S.C. § 2201(o)), and to otherwise issue, rescind and amend such rules and regulations as may be necessary to carry out the purposes of the Act (42 U.S.C. § 2201(p)).

The AEA authorizes the Atomic Energy Commission to produce or enter into contracts for the production of special nuclear material, such as fissionable uranium, in its own facilities (42 U.S.C. § 2061(b)). Such production contracts must contain provisions prohibiting subcontracting except as authorized by the Commission and obligating the Contractor to make reports to submit to inspections and to comply with all safety and security regulations formulated by the Commission. The Commission may also enter into agreements with commercial medical therapy, research and development, and materials licensees, for the processing, fabricating, separating or refining in Commission-owned facilities of source, byproduct and special nuclear materials (42 U.S.C. § 2201(m)). The Act also authorizes the Commission to distribute special nuclear material and sell, lease or otherwise make available source material or byproduct material such as radioisotopes to qualified applicants within the United States for use in licensed or other approved activities (42 U.S.C. § 2073(a), § 2093(a), and § 2111).

The Atomic Energy Act makes the Commission the exclusive owner of all facilities for the production of special nuclear material other than those which are useful in certain fields of research which do not have sufficient capacity to produce an atomic weapon, or which are licensed for commercial uses, medical therapy or other certain purposes (42 U.S.C. § 2061).

It is unlawful for any person to deal with a utilization or production facility except in accordance with a license issued by the Atomic Energy Commission (42 U.S.C. § 2131). However, no license is required for operations under contract with the Commission or for authorized activities of the Department of Defense (42 U.S.C. § 2140).

Congress amended the AEA in 1959 in order to more carefully define the respective regulatory roles to be played by the State and Federal governments in the area of nuclear energy. That 1959 clarification, contained in Section 274 of the Act (42 U.S.C. § 2021(a)), was intended to recognize the interests of the states in the peaceful uses of atomic energy and to clarify the respective responsibilities under the AEA of the states and the AEA (now DOE and NRC) with respect to the regulation of by-product, source and special nuclear materials.

The 1959 amendment authorized the AEC to enter into agreements with individual states providing for the discontinuance of AEC regulatory authority over by-product, source and special nuclear materials "in quantitites not sufficient to form a critical mass." The authority which the AEC could grant to the State was, however, circumscribed: the transfer could be affected only by specific agreement and the AEC could not delegate to any state the authority to license or regulate, from the standpoint of radiological health and safety, the construction and operation of production and utilization facilities, including nuclear power plants. The 1959 amendment reserved to the AEC certain other enumerated activities as well.

In the comments accompanying the 1959 amendment, the Joint Congressional Committee on Atomic Energy made clear that where the AEC had not or could not properly delegate its regulatory authority to state or local government, Federal control was to be exclusive:

> "It is not intended to leave any room for the exercise of dual or concurrent jurisdiction by states to control radiation hazards by regulating by-product, source or special nuclear material." 1959 U. S. Code Congr. & Admin. News, Volume 2, Pg. 2879.

In 1974, the original authorities of the Atomic Energy Commission were split into the Energy Research and Development Administration (ERDA) and the Nuclear Regulatory Commission (NRC) by the Energy Reorganization Act of 1974 (Public Law 93-438). The declared purpose of the new law was to assure coordination and effective development of all energy sources and to separate the licensing and related regulatory functions of AEC from the performance of the other functions of the Commission. The five-member independent NRC was created to assume the licensing and related regulatory functions of AEC. With regard to the authority of NRC to regulate ERDA activities, NRC was granted licensing authority only over ERDA's demonstration liquid-metal fast breeder reactor, other demonstration reactors (except those already in existence), facilities used for the receipt and storage of high-level radioactive wastes and retrievable surface storage facilities. The new commission received authority to conduct reasonable inspections and enforcement activities to ensure compliance with its rules and regulations in these areas.

All of the functions, authorities and resources of the Atomic Energy Commission other than licensing, regulatory, and a limited amount of research activities, were transferred to ERDA (Public Law 93-438, Section 104 and Section 301h.). The transfers from AEC included nuclear materials production, reactor development, physical research, biomedical and environmental research, control thermonuclear research, and non-nuclear energy research and development.

An additional change occurred in 1977. The Department of Energy (DOE) was created by Public Law 95-91, and brings together the many programs and offices relating to energy which were spread throughout the Federal Government. Beginning operation on October 1, 1977, the Department incorporates all of the former functions of the Federal Energy Administration, the Federal Power Commission, the Energy Research and Development Administration and other functions from separate United States departments. (See specifically Section 707.)

While Congress, through the various reorganizations, sought to promote the peaceful development, utilization, consolidation and efficent operation of energy programs, the language of the Atomic Energy Act has been continued through the various organizations and makes it quite clear that the Federal Government would retain comprehensive control over the processing and use of specified nuclear materials (see Northern States Power Company vs. State of Minnesota, 477 F.2d 1143 (8th Cir. 1971) aff'd. mem., Minnesota vs. Northern States Power Company, 405 U.S. 1035 (1971) (hereinafter "Northern States")). The authority for exertion of this Federal control is now vested both in the DOE and NRC and they remain authorized to establish such standards as may be necessary or desireable to protect health or to minimize danger to life or property for their respective programs and/or licensees (42 U.S.C. § 2201(b)) (see also

42 U.S.C. § 2073(b)(e), 2093(b), 2111 and 2133(a)(d)). Pursuant to this authority, the Nuclear Regulatory Commission has established by regulation maximum permissible releases of source, by-product and special nuclear materials in the environment (10 CFR § 20.106 and Appendix B - Table II (1976)). It should be noted that the AEA provides licensing provisions which permit private parties to engage in the production of atomic energy for industrial or commercial purposes. The licensing and radioactive emission provisions of the NRC are not applicable to DOE or its operating contractors (Public Law 93-438 § 202, and also 10 CFR § 30.4(k) and 10 CFR § 20.2). DOE regulates and sets radioactive release limits for its operations under ERDA Manual Chapter 0524.

As the statutory framework outlined above makes clear, Congress has created a comprehensive scheme for the Federal regulation of nuclear energy. This plan was described in Northern States, supra, at Page 1153, as follows:

> "The Federal Licensing Scheme to control the development and utilization of atomic energy as established by Congress and implemented by the AEC is extraordinarily pervasive. Probably more pervasive than any regulatory scheme considered by the Supreme Court in analgous [preemption] cases. . .." (447 F.2d 1143, 1153.)

The legislation creating ERDA, NRC, and later DOE, and subsequent legislation, has not evidenced any alteration of this "extraordinarily pervasive" scheme. Nor is there any indication that Congress has retreated from its commitment to the development of nuclear energy.

II. FEDERAL PREEMPTION

The first state to challenge the Federal regulatory scheme with respect to nuclear energy was Minnesota, which attempted to impose on a nuclear power plant radioactive discharge levels substantially more stringent than those required by the AEC. The utility company, Northern States Power, thereafter sought a judgment declaring Minnesota to be without authority to regulate in this area. The issue was decided by the 8th Circuit in Northern States Power Company, supra, the first Federal court decision to squarely address the issue of preemption in the field of nuclear energy. In that case, it was held that Minnesota's attempts to regulate were preempted by the Federal Government which possessed exclusive authority to regulate the construction and operation of nuclear power plants; the decision was affirmed by the Supreme Court (405 U. S. 1035).

The Court of Appeals began its inquiry in Northern States with a thorough analysis of the Atomic Energy Act of 1954, as well as the 1959 Amendment, 42 U.S.C. § 2021. The Court found that this latter enactment clearly established two fundamental principles with respect to the relationship of the Federal and State governments in the area of nuclear regulation.

First, 42 U.S.C. § 2021 established that Congress intended Federal occupancy of regulations over all radiation hazards except where jurisdiction was expressly ceded to the states, and second, Section 2021(c) prohibited the AEC from turning over to the states its authority and responsibility with respect to the regulation of certain specified activities, including the construction and operation of nuclear power plants. Thus,

> ". . .[T]he Act, as amended, and its legislative history, when viewed together, provide the strongest manifestation of Congressional intent to preempt the field of regulation over the construction and operation of nuclear reactors, . . ." (447 F.2d 1143, 1152.)

The Northern States decision makes clear that where a state attempts to regulate areas "inextricably intertwined with the planning, construction, and entire operation" of a nuclear power plant, this amounts to a dual system of licensing and regulation with control exerted by both the State and Federal government. Such a dual system of regulation would permit the states, if they so wished, to interfere with the Federal scheme, particularly with the authority of the AEC (NRC) to resolve the proper balance between industrial progress and adequate health and safety standards, and would therefore constitute an "obstacle to the accomplishment and execution of the full purposes and objectives of Congress." (Hines v. Davidowitz (312 U. S. 52, 67 (1941)). Under these circumstances, preemption is mandated.

In Train v. Colorado Public Interest Research Group (96 S. Ct. 1938 (1976)), the Supreme Court, in a unanimous decision written by Justice Marshall, had occasion to consider the effect of Northern States on the construction of language contained in the Federal Water Pollution Control Act ("FWPCA").

The FWPCA established a regulatory program to control and abate water pollution stating as its ultimate objective the elimination of all discharges of "pollutants" into the navigable waters by 1985. In furtherance of this objective, the FWPCA calls for the achievement of specific limitations on pollutants and the implementation of control technology by specific dates. These effluent limitations are enforced through a permit program. The discharge of "pollutants" into the water is unlawful without a permit issued by the Administrator of the EPA or, if a state has developed a program that complies with the FWPCA, by the state. (33 U.S.C. § 1311(a)).

The term "pollutant" is defined by the FWPCA to include "radioactive materials," but when the Administrator of the EPA adopted regulations governing the permit program (40 CFR Part 125 (1975)), he specifically excluded source, by-product and special nuclear materials, those covered by the AEA, from the program upon his understanding of the relevant legislative history of the FWPCA:

> "The legislative history of the Act reflects that the term 'radioactive materials' as included within the definition of 'pollutant' in Section 502 of the Act covers only radioactive materials which are not encompassed in the definition of source, by-product or special nuclear materials as defined by the Atomic Energy Act of 1954, as amended, and regulated pursuant to the latter Act. Examples of radioactive materials not covered by the Atomic Energy Act and, therefore, included within the term 'pollutant' are radium and accelerator produced isotopes, 40 CFR § 125.1(y) (1975)." (96 S. Ct. 1938, 1943.)

The subject case arose out of a citizen's suit against Russell Train, Administrator of the Environmental Protection Agency, for his refusal to regulate discharges of source, by-product and special nuclear materials covered by the Atomic Energy Act. The suit maintained that the word "pollutants" in the Federal Water Pollution Control Act included the nuclear materials and that Train had a non-discretionary duty to regulate in this area. Justice Marshall in reviewing the legislative history of the FWPCA had occasion to set forth an exchange between Senators Muskie and Pastore over the possible conflict between the regulatory responsibilities contained in the FWPCA and the Atomic Energy Act. That exchange was quoted by the Court as follows:

> "MR. PASTORE. . . .
>
> My question is this: Does this measure that has been reported by the committee in any way affect the existing law, that is, the existing Atomic Energy Act of 1954, insofar as the regulatory powers of the AEC are concerned with reference to radioactive material?
>
> MR. MUSKIE. It does not; and it is not the intent of this act to affect the 1954 legislation.
>
> MR. PASTORE. In other words, this bill does not change that feature of the Atomic Energy Act in any regard?
>
> MR. MUSKIE. That is correct.
>
> MR. PASTORE. I thank the Senator.

MR. MUSKIE. May I say in addition, that legislation dealing with the setting of effluent limitations as they involve nuclear power plants is now pending in the courts. The Senator is aware of that litigation.

For example, a recent decision of the U. S. Court of Appeals for the Eighth Circuit, in the case of Northern States Power and Light versus Minnesota, raises the issue. I would like to point out that the committee considered speaking specifically to that decision, but chose to remain silent so as not to prejudice the decision or any appeal from it.

MR. PASTORE. Yes. As a matter of fact, that decision held that the Federal Government did preempt in this field under existing law. That is, the opinion, and we hope this legislation does not change that opinion in any way, and does not affect existing law. That is all I am concerned with.

MR. MUSKIE. The Senator is correct in his evaluation of the legislation on that point.

Justice Marshall then described the import of the holding in Northern States, supra, as follows:

> "The thrust of Senator Muskie's assurances that the FWPCA would not 'in any way affect' the regulatory powers of the AEC was, we think, that the AEC was to retain full authority to regulate the materials covered by the Atomic Energy Act, unaltered by the exercise of regulatory authority by any agency under the FWPCA. This conclusion is reinforced by Senator Muskie's reference to the case of Northern States Power Company v. Minnesota [citation ommitted]. In that case, which was subsequently affirmed summarily by this Court . . . the Eighth Circuit had held that the Atomic Energy Act created a pervasive regulatory scheme, vesting exclusive authority to regulate the discharge of radioactive effluents from nuclear power plants in the AEC, and preempting the States from regulating such discharges. The absence of any room for a state role under the Atomic Energy Act in setting limits on radioactive discharges from nuclear power plants stands in sharp contrast to the scheme created by the FWPCA which envisions the development of state permit programs . . ., and allows the States to adopt effluent limitations more stringent than those required or established under the FWPCA. Senator Muskie's specific assurance to Senator Pastore that the FWPCA would not affect existing law as interpreted in Northern States can only be viewed, we think, as an indication that the exclusive

regulatory scheme created by the Atomic Energy Act for source, by-product, and special nuclear materials was to remain unaltered." (96 S. Ct. 1938, 1945).

It is clear from Train v. Colorado Public Interest Research Group that the Environmental Protection Agency has no authority under the FWPCA to regulate the discharge into the Nation's waterways of nuclear waste materials subject to regulation by the AEC, its licensees and successor agencies (NRC and DOE).

III. RCRA AND RADIOACTIVE MATERIAL INCLUDING SOURCE, SPECIAL NUCLEAR AND BY-PRODUCT MATERIAL

The FWPCA, through reference to its legislative history, clearly provides an exemption for source, special nuclear and by-product material from regulation under the Act and EPA's implementing regulations. The RCRA evidences this same intent, not through its legislative history but rather in the text of the Act itself. Section 1006 of the RCRA states:

> "(a) Application of Act: Nothing in this Act shall be construed to apply to (or to authorize any state, interstate, or local authority to regulate) any activity or substance [underscoring added] which is subject to the . . . Atomic Energy Act of 1954 (42 U.S.C. 2011 and following) except to the extent that such application (or regulation) is not inconsistent with the requirements of such Acts."

It is clear from the foregoing that both activities and substances subject to the AEA are to be free from regulation of the RCRA. The substances include source, special nuclear and by-product material. AEA activities include the enrichment of fissionable material, production of accelerator isotopes, nuclear waste disposal, nuclear research and development, etc., and numerous others cited in the AEA, ERDA or DOE Acts.

The RCRA, similar to the FWPCA, envisions a large role by the states in the regulation of solid and hazardous wastes, and would permit states to adopt rules more stringent than those required or established by EPA under the RCRA. The same considerations which Justice Marshall cited in the Train case (supra), must also apply to the RCRA. That is, "The Atomic Energy Act created a pervasive regulatory scheme, vesting exclusive authority" over AEA substances to DOE and NRC.

EPA in its implementation of the statutory language at 40 CFR § 261.4 yields to the AEA wherein it states:

> "a. Materials which are not solid wastes. The following materials are not solid wastes for the purpose of this Part:
>
> * * *
>
> (4) Source, special nuclear or by-product material as defined by the Atomic Energy Act of 1954, as amended, 42 U.S.C. 2011 et seq."

EPA does not further enumerate in its regulations the activities subject to the AEA which are exempt. However, it can reasonably be construed that they include but are not limited to activities which produce, process or dispose of source, special nuclear or by-product material as authorized by the AEA. For example, 42 U.S.C. § 2061(b) authorizes the following:

> "Operation of Commission Production Facilities
>
> The Commission [AEC] is authorized to produce or provide for the production of special nuclear material in its own production facilities. To the extent deemed necessary, the Commission is authorized to make, or to continue in effect, contracts with persons obligating them to produce nuclear material in facilities owned by the Commission . . . ." 42 U.S.C. § 2016(b).

The activities of the DOE as authorized by the AEA are not limited to the production of special nuclear material. Many nuclear energy related activities are currently in research, development or decommissioning modes at the various DOE facilities. Many of the activities generate radioactive material not definable as source, special nuclear or by-product material.

The EPA regulations at 10 CFR §§ 261.10 and 261.20 state the characteristics of hazarous waste. The characteristics cited by EPA include ignitability, corrosivity, reactivity, and toxicity. EPA refrained from adding organic toxicity, carcinogenicity, mutagenicity, teratogenicity, bioaccumulation and radioactivity. Radioactivity was cited as a possible characteristic in previous draft regulations but it has been specifically omitted from the final version. It would appear that the EPA is unwilling to regulate radioactivity without further study. Therefore, it would appear that DOE activities involved with the production, transfer, storage or disposal of radioactive material not qualifying as source, special nuclear or by-product material, are exempt from regulation under the RCRA.

The penultimate question remains does RCRA apply to mixed waste streams containing excluded nuclear wastes and wastes which are defined to be hazardous under the EPA regulations? A review of the definitions of source, special nuclear and by-product material would indicate "no." The AEA, as amended, defines the terms as follows:

> "Source Material: (1) uranium, thorium, or any other material which is determined by the Commission pursuant to the provisions of Section 2091 of this Title to be source material; or (2) is containing one or more of the foregoing materials in such concentration as the Commission may by regulation determine from time to time. (42 U.S.C. § 2014(z).)
>
> Special Nuclear Material: (1) plutonium, uranium enriched in the isotope-233 or in the isotope-235 and any other material which the Commission pursuant to the provisions of Section 2071 of this Title determines to be special nuclear material but does not include source material; or (2) any material artificially enriched by any of the foregoing, but does not include source material. (42 U.S.C. § 2014(aa).)
>
> By-Product Material: any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material. (42 U.S.C. § 2014(e).)

The Uranium Mill Tailings Radiation Control Act of 1978 (Public Law 95-604), Section 201, amends the definition of "by-product material" in the Atomic Energy Act of 1954 to include uranium mill tailings and other wastes. The new definition of by-product material is:

> "By-Product Material: (1) any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material; and (2) the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore process primarily for its source material content."

In the recent amendment to the definition of by-product material, it appears that Congress intended to expand the definition. It now includes all radioactive material created through exposure to special nuclear material incident to AEA authorized activities and all tailings or wastes produced by AEA-authorized activities. Inclusive within this definition is material, possibly including RCRA hazardous material, which has been exposed to or mixed with special nuclear material. It is counsel's conclusion that the explicitness of the definition and statutory language permits the exemption of these mixtures from regulation under RCRA.

A more difficult question concerns the exempt status of hazardous material which has become radioactive as a result of exposure to or mixture with non-AEA radioactive material. It is clear that EPA did not intend to regulate radioactivity per se. However, it was certainly not the intent of Congress to exempt all DOE activities authorized by the AEA from regulation under RCRA (Public Law 94-580 § 6001). DOE activites which generate, store, transport or dispose of non-radioactive hazardous wastes are subject to the RCRA the same as any person or corporation.

No clear expression of intent on the part of either Congress or EPA is discernable from an examination of the RCRA background documents concerning non-AEA radioactive/hazardous mixtures. As a practical matter most mixtures will, in fact, fall within the parameters of the expanded definition of by-product material. However, how far this interpretation can reach is not easily determinable. It is doubtless that non-radioactive contaminated, chemically hazardous wastes are generated and mixed with AEA and non-AEA radioactive materials as a result of solvent decontamination or other processes. Can these mixtures truly qualify as by-product materials?

The unquestioned intent and purpose of the activities is to process AEA and non-AEA radionuclides as authorized under the AEA. Chemically hazardous wastes associated with these streams are a relatively minor concern due to their small volume. To segregate the chemically hazardous waste components from the exempt radioactive waste in order to enter them into the hazardous management system would be unreasonable.

IV. CONCLUSION

Counsel will recommend that all reasonable attempts be made by operators of DOE activities to prevent the introduction of chemically hazardous materials to AEA and non-AEA radioactive materials.

Further regulation of AEA or non-AEA waste streams co-contaminated with chemicals deemed hazardous by RCRA and EPA rules will not be submitted to. The exemptions for activities or substances, both express or implied, are broad enough to exclude radioactive substances, including their constituent parts, from waste reports required to be submitted to the U. S. Environmental Protection Agency.

David G. Darugh

David G. Darugh, Attorney
Office of Chief Counsel

CC-10:DGD

cc: J. F. Wing, EP Branch
William Dennison, GC-34, DOE HQ

80 2180 8
-1-

Department of Energy
Oak Ridge Operations
P.O. Box E
Oak Ridge, Tennessee 37830

July 24, 1980

To Those on Attached Listing

CHANGE TO RCRA/AEA MATERIALS INTERPRETATION

In ORO's July 3 letter to your plant manager a policy was set forth regarding source, special nuclear and by-product material (AEA materials) as defined in the Atomic Energy Act, and their interaction with the Resource Conservation and Recovery Act (RCRA). It was stated that the exemption for AEA materials in the RCRA applied only to the radioactive substances themselves and not any other material the AEA material might be associated with. The effect of this interpretation would be that, for a chemically hazardous waste associated with an AEA material, both NRC/DOE requirements and the RCRA would apply.

In conjunction with other Field Offices, ORO is attempting to effect a broadening of the definition of AEA materials. The expanded definition would encompass not only the AEA material radionuclides but the entire mixture of materials which is generated by one of our processes which contains source, special nuclear or by-product material, and which, in the past, has been treated as radioactively contaminated waste. This interpretation would serve to exempt that particular waste stream from the RCRA, and lower your burden of reports, etc.

If our efforts are successful, then we will not wish to report such wastes to the U.S. EPA. Therefore, for the hazardous waste notification forms due to this office on August 4, 1980, please provide a list of those wastes and waste treatment and disposal systems which relate to the broader definition of AEA materials. The list should be so constructed such that my staff will be able to identify these wastes and systems on your completed hazardous waste reporting forms, and delete them.

One final note, please review the July 16, 1980 Federal Register in which EPA listed additional wastes affected by the RCRA. If you have any questions, please contact Gabe Marciante.

Sincerely,

J. F. Wing

J. F. Wing, Chief
Environmental Protection Branch

MS-331:GJM

Department of Energy
Washington, D.C. 20585

JUL 30 1980

James A. Rogers, Esq.
Associate General Counsel
U.S. Environmental Protection Agency
A-131
401 M Street, S.W.
Washington, D.C. 20460

Dear Mr. Rogers:

In the course of the Department of Energy's review of the hazardous waste management regulations recently prescribed by EPA pursuant to the Resource Conservation and Recovery Act (RCRA), a question has arisen regarding the applicability of EPA's rules to waste streams composed of a mixture of hazardous waste with the kinds of nuclear waste which are excluded from coverage under the RCRA program. Specifically, both RCRA and Section 261.4(a)(4) of the EPA rule provide that source, special nuclear, and byproduct material, as defined by the Atomic Energy Act of 1954, are not solid waste and thus are not considered hazardous waste.

The applicability of the EPA rules to mixed waste streams containing both excluded nuclear wastes and wastes which are defined to be hazardous under the EPA rules is an issue not addressed by EPA's rules. I understand from your July 29, 1980 telephone conversation with Bill Dennison of my office that this particular question has not previously been considered at the policy-making level within EPA.

In view of the approaching deadlines for notification of harzardous waste activities and for compliance with Phase I interim status standards I think it important that this ambiguity be resolved as early as possible. The Department of Energy programs which produce these mixed wastes believe that there are persuasive arguments in favor of excluding such wastes from EPA's hazardous waste management program. I would be please to coordinate DOE participation in a meeting with EPA to discuss this issue.

Sincerely,

Stephen H Greenleigh

Stephen H. Greenleigh
Assistant General Counsel
for Environment

(2.b.)

Department of Energy
Washington, D.C. 20585

AUG 05 1980

NOTE FOR CHIEF COUNSELS, DOE FIELD OFFICES
REGIONAL COUNSELS, DOE REGIONAL OFFICES

FROM: STEPHEN H. GREENLEAF
ASSISTANT GENERAL COUNSEL FOR ENVIRONMENT

SUBJ: APPLICABILITY OF EPA HAZARDOUS WASTE REGULATIONS TO MIXED WASTE

Attached for your information is a copy of a letter dated July 30, 1980 that I sent to James A. Rogers, Associate General Counsel, EPA which raises a question concerning the applicability of EPA's recently prescribed hazardous waste management regulations to waste streams containing both hazardous waste and exempted nuclear waste. I understand that EPA's regional offices have been providing conflicting guidance on this issue. I will keep you apprised of developments in resolving the issue.

Attachment:
As stated

UNCLASSIFIED ONLY

US DEPT. OF ENERGY
1980 OCT 14 PM 3 34

[illegible] OCT 14 [illegible]

Department of Energy
Washington, D.C. 20545

MSG. NR. 003469
(Commcenter Use Only)

Communications Center
Germantown, Maryland

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DATE 10/14/80

TO: DEWEY LARGE (Name) OR (Location) 626 - 0715 (Telephone Nr.)

FROM: WALT FRANKHAUSER (Name) HQ (Location) 233 - 3610 (Telephone Nr.)

THIS TRANSMITTAL CONSISTS OF 3 PAGES. (Excluding Cover Sheet)

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OR MAIL STOP 6-107 (If by MAIL)

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SIGNATURE

UNCLASSIFIED ONLY

69-1

Note to: Dewey Large, OR

From: Walt Frankhauser, HQ

Subject: Regulatory Happenings

10/14/80

1) Resource Conservation and Recovery Act (RCRA)

- OGC has prepared a paper, to be submitted to EPA counsel, which argues that all DOE AEA activities are exempt from control under RCRA.
- A draft copy was sent to Bill Snyder at OR on Oct 2, 1980.
- The arguments will be presented to EPA when the paper gets through the concurrence chain. EV does not now concur, and for the following reasons:
  - feels that hazardous (non-nuclear) materials managed at AEA facilities should be controlled by RCRA and that a blanket exemption of all AEA activities is inappropriate.
  - feels that using the OSHA exemption argument is not a good parallel since people living off-site are affected by environmental matters, but not OSHA.
  - feels that "the trend is to have federal facilities regulated by states." Also feels that "a DOE public position, opposed to state regulations, has serious public relations implications for the Department."

2) Safe Drinking Water Act (SDWA)

- The above paper does not deal with exemption under SDWA.
- SDWA does not contain non-interference provisions with AEA activities, as does RCRA, so we can't use the same arguments to pursue exemption.

69-3

4) Miscellaneous

- In your monthly operations summary, under SOLID WASTE STORAGE AND DISPOSAL, it would be instructive if the volume of off-site generated waste received (e.g. KAPL TRU) were shown.
- Your comments on any of the above are welcome.

Walt Franklausen

Department of Energy
Washington, D.C. 20585

November 17, 1980

MEMORANDUM FOR ASSISTANT SECRETARIES
DIRECTOR OF ENERGY RESEARCH
HEADS OF FIELD ORGANIZATIONS

9648

FROM: WORTH BATEMAN
ACTING UNDER SECRETARY

SUBJ: COMPLIANCE WITH EPA HAZARDOUS WASTE REGULATIONS

Regulations prescribed by the Environmental Protection Agency (EPA) pursuant to the Resource Conservation and Recovery Act (RCRA) require that any DOE facility which treats, stores or disposes of hazardous waste must file Part A of the prescribed EPA hazardous waste permit application by November 19, 1980, or else cease all hazardous waste management activities at that facility. RCRA does not apply to source, special nuclear, or byproduct materials as defined by the Atomic Energy Act of 1954 (AEA). Additionally, section 1006(a) of RCRA provides that RCRA does not apply to any activity or substance which is subject to the AEA except to the extent that any RCRA requirement would not be inconsistent with the requirements of the AEA. A number of DOE offices engaged in programmatic responsibilities under authority of the AEA have requested guidance as to the significance of section 1006(a). Specifically, they have requested guidance as to what information regarding AEA program wastes should be included in their permit application.

The attached letter of November 14, 1980 from DOE's Assistant General Counsel for Environment, Stephen H. Greenleigh, to his EPA counterpart, James A. Rogers, takes the position that the application of RCRA to DOE's AEA programs would be inconsistent with the regulatory structure established by the AEA, with regard to both radioactive and nonradioactive hazardous wastes. Pending resolution of this issue with EPA and for purposes of the November 19 permit application deadline, any DOE facility engaged in AEA activities should attach a cover letter to its permit application stating DOE's understanding that AEA program wastes are not regulated by RCRA, and stating that because of this understanding those wastes are not included in the application. The letter should further indicate that should DOE's understanding subsequently be modified, the DOE facility would then furnish EPA with additional information as appropriate. The permit application should of course provide the requested information for wastes not associated with AEA programs.

The Office of Environment will continue to inform the concerned line program offices of further developments in this area. Any questions relating to this memorandum should be referred to Thomas Frangos, Director, Office of Environmental Compliance and Overview, or to Stephen H. Greenleigh, Assistant General Counsel for Environment, as appropriate.

Attachment:
  As stated

5/22

Department of Energy
Washington, D.C. 20585

NOV 14 1980

Mr. James A. Rogers, Esq.
Associate General Counsel
U.S. Environmental Protection
Agency
A-131
401 M Street, S.W.
Washington, D.C. 20460

9648

Dear Mr. Rogers:

In a July 30, 1980 letter to you I called to your attention an issue regarding the applicability of EPA's hazardous waste management program established under authority of the Resource Conservation and Recovery Act (RCRA) (Pub. L. 94-580), to certain Department of Energy programs conducted under authority of the Atomic Energy Act of 1954 (AEA) (42 U.S.C. 2011 et seq.) This letter is intended to convey the position of the Department of Energy with regard to this issue.

Section 1006(a) of RCRA provides:

> Nothing in this Act shall be construed to apply to (or to authorize any State, interstate, or local authority to regulate) any activity or substance which is subject to...the Atomic Energy Act of 1954 (42 U.S.C. 2011 and following) except to the extent that such application (or regulation) is not inconsistent with the requirements of [the Atomic Energy Act].

The Department of Energy recognizes its statutory obligation to comply with all applicable Federal, State, interstate and local requirements, whether substantive or procedural, for the control and abatement of hazardous waste. It is DOE's policy to comply fully with the Congressional mandate contained in section 6001 of RCRA for all activities to which that statute applies. For the reasons discussed below, however, DOE believes that section 1006(a) of RCRA makes EPA's hazardous waste management regulations inapplicable to DOE activities performed under authority of the AEA.

As successor to the Atomic Energy Commission, DOE is directed by section 31(a) of the AEA (42 U.S.C. §2051(a)) to make arrangements for the conduct of research and development activities relating to:

(1) nuclear processes;

(2) the theory and production of atomic energy, including processes, materials, and devices related to such production;

(3) utilization of special nuclear material and radioactive material for medical, biological, agricultural, health, or military purposes;

(4) utilization of special nuclear material, atomic energy, and radioactive material and processes entailed in the utilization or production of atomic energy or such material for all other purposes, including industrial or commercial uses, the generation of usable energy, and the demonstration of advances in the commercial or industrial application of atomic energy;

(5) the protection of health and the promotion of safety during research and production activities; and

(6) the preservation and enhancement of a viable environment by developing more efficient methods to meet the Nation's energy needs.

DOE is also authorized and directed by section 41(b) of the AEA (42 U.S.C. §2061(b)) to "produce or to provide for the production of special nuclear material in its own production facilities." Section 91(a) of the AEA (42 U.S.C. §2121(a)) further authorizes DOE to perform research and development work in the military application of atomic energy, and to engage in the production of atomic weapons. These statutory provisions constitute the basic legal authority for DOE to engage in its various atomic energy activities. Accordingly, it may readily be seen that these activities are "subject to" the AEA within the meaning of section 1006(a) of RCRA.

The application of EPA's hazardous waste management regulations to these DOE atomic energy activities would be duplicative and inconsistent with the requirements of the AEA and with DOE's responsibilities under that statute, because the AEA itself establishes a regulatory framework by which DOE, as successor to the Atomic Energy Commission, is authorized to prescribe and enforce regulations and other requirements necessary for the sound management of its AEA activities. Section 161(i)(3) of the AEA (42 U.S.C. §2201(i)(3)), for example, authorizes DOE to prescribe regulations necessary "to govern any activity authorized pursuant to this chapter, including standards and restrictions governing the design, location, and operation of facilities used in the conduct of such activity, in order to protect health and to minimize danger to life or property." Paragraph (j) of the same section authorizes DOE, "without regard to... any other law," to "make such disposition as it may deem desirable of (1) radioactive materials and (2) any other property, the special disposition of which is, in the opinion of [DOE], in the interest of the national security...." In light of this broad regulatory authority conferred upon DOE by the AEA, any effort to subject DOE's atomic energy activities, especially activities involving the disposition of radioactive materials, to further regulatory requirements under the RCRA hazardous waste program would be duplicative and inconsistent with DOE's discharge of the responsibilities conferred upon it by the AEA.

Specifically, RCRA's authorization of any State regulatory power is inconsistent with the AEA to the extent that RCRA is interpreted to apply to any radioactive materials, because the AEA scheme for the regulation of atomic energy has been authoritatively interpreted as preempting any State regulation of radiation hazards which is not sanctioned by the AEA itself. Northern States Power Co. v. Minnesota, 447 F.2d 1143 (8th Cir. 1971), aff'd, 405 U.S. 1035 (1972). Accord, Train v. Colo. Public Interest Research Group, 426 U.S. 1 (1976), in which a unanimous Supreme Court at page 16 characterized Northern States, supra, as holding "that the AEA created a pervasive regulatory scheme, vesting exclusive authority to regulate the discharge of radioactive effluents from nuclear power plants in the AEC, and pre-empting the States from regulating such discharges." The applicability of the doctrine of preemption is generally dependent upon whether under the circumstances of a particular case a State requirement stands as an obstacle to the accomplishment of the Federal purpose. Northern States holds, however, that the regulatory scheme embodied in the AEA is sufficiently pervasive to preempt all State regulation of radiation hazards, regardless of factual circumstances, unless sanctioned by the AEA itself:

> [R]egulation of the radioactive effluents discharged from a nuclear power plant is inextricably intertwined with the planning, construction and entire operation of the facility....Congress vested the AEC with the authority to resolve the proper balance between desired industrial progress and adequate health and safety standards. Only through the application and enforcement of uniform standards promulgated by a national agency will these dual objectives be assured....In short, a dual system of licensing and regulation with control exerted by both the states and the Federal government over the level of radioactive effluents discharged from nuclear power plants would create an obstacle to the accomplishment and execution of the full purposes and objectives of Congress'. 447 F.2d at 1153-4.

Although the particular language cited above refers to preemption of State regulation of "radioactive effluents," the Northern States court and courts in successive cases have without exception viewed the AEA as preempting, except to the extent authorized by the AEA itself, all State regulation of radiation hazards generally. See, e.g., United States v. City of New York, 463 F. Supp. 604 (S.D. N.Y., 1978); Pacific Legal Foundation v. State Energy Resources Conservation and Development Commission, 472 F. Supp. 191 (S.D. Cal., 1979); Pacific Gas and Electric Co. v. State Energy Resources Conservation and Development Commission, 489 F. Supp. 699 (E.D. Cal., 1980). As the Northern States court stated, "Congress intended Federal occupancy of regulations over all radiation hazards except where jurisdiction was expressly ceded to the States [i.e., by the AEA]." 447 F.2d at 1150.

All of these cases involve State efforts to regulate commercial nuclear power plants. Accordingly, these cases in their analysis of Federal preemption focus upon the Federal interest associated with the commercial development of nuclear energy. Even more compelling, from the standpoint of preemption, is the Federal interest associated with DOE's AEA activities, which deal primarily with national security and the national defense. Thus, there can be no doubt that the AEA's preemption of State regulation of radiation hazards in the commercial context is equally preemptive in the context of DOE's atomic energy activities under any factual circumstances. There is nothing in RCRA itself or its legislative history to suggest that RCRA was intended to alter the preemptive aspect of the AEA regulatory structure, and we believe that the language of section 1006(a) of RCRA plainly disclaims any such intention. Accordingly, it is our view that radioactive materials produced in connection with DOE's AEA activities are not subject to regulation under RCRA.

Indeed, this same legal conclusion would appear equally valid for nonradioactive wastes produced by DOE's AEA programs, in view of the national security interests associated with those programs. Although section 3009 of RCRA provides that no State requirements may be less stringent than the EPA requirements, there is no comparable provision which would prevent any State from adopting requirements which are more stringent than EPA's. Both RCRA and the implementing EPA regulations provide that approvable State plans must be "equivalent to" and "consistent with" Federal requirements, but the fact remains, as EPA stated in its May 19, 1980, Federal Register preamble (45 FR 33385), that "States may impose requirements under their own laws which are more stringent than the Federal requirements". This possibility is further underscored by the new language added to section 3009 pursuant to section 14 of P.L. 96-482, the Solid Waste Disposal Act Amendments of 1980, which provides that "[n]othing in this title shall be construed to prevent any State or political subdivision thereof from imposing any requirements including those for site selection, which are more stringent than [EPA's] regulations." Such State requirements must be fulfilled by Federal agencies to the extent that section 6001 of RCRA is applicable. Failure or inability of a particular Federal or non-Federal facility to comply could result in the State's refusal to issue a RCRA permit, the consequent cessation of all hazardous waste treatment, storage or disposal operations at that facility, and perhaps even the closure of that facility.

Even conceding the probable good faith of all concerned State and Federal agencies, DOE anticipates that some States may prescribe hazardous waste requirements which could be unnecessarily restrictive but arguably not "inconsistent" within the meaning of section 123.32 of the EPA regulations. Any actual occurrence of this type which interfered with the conduct of DOE activities under the AEA would clearly be inconsistent with the AEA provisions discussed above, which provide sufficient direction and authority for DOE itself to manage those activities in an environmentally acceptable manner. The mere possibility of such an occurrence, measured against the national defense implications of the DOE activities, argues for recognition of the preemptive effect of the AEA regulatory scheme under any factual circumstances for nonradioactive as well as radioactive wastes. The breadth of the language employed by Congress in section 1006(a) of RCRA supports this view. Had the legislative intent been to apply that section's exclusionary effect only to radioactive materials, Congress could easily have chosen language having only that narrow effect. Instead, section 1006(a) is broadly drafted to exclude from RCRA's ambit "any activity or substance" (emphasis added) which is subject to the AEA, to the extent that the application of RCRA would be inconsistent. Accordingly, we believe that section 1006(a) of RCRA must be read in conjunction with the AEA to exclude nonradioactive as well as radioactive AEA program wastes from RCRA's coverage.

I wish to stress DOE's commitment to the sound management of all activities, including waste disposal, conducted under the AEA. DOE is currently in the process of issuing new environmental, safety and health management directives to replace the existing directives which were developed by DOE's predecessor agencies. The result of this process will be a series of Orders and supplemental chapters establishing policies and detailed procedures for meeting all of DOE's environmental, health and safety responsibilities including matters, such as occupational health and safety in atomic energy programs, for which DOE is independently responsible. As part of this effort DOE is presently studying EPA's new RCRA regulations to determine how best to assure that management of even those activities which we believe are not directly regulated by RCRA will achieve comparability with the intent of EPA's regulations. A staff of 350 Federal employees, including 275 stationed at field installations, are occupied full time in assuring that DOE complies with all applicable environmental, safety and health requirements. Their efforts are guided and monitored by DOE's Assistant Secretary for Environment.

DOE's record of performance in this area, particularly with regard to AEA activities involving occupational health and safety, has been exemplary. DOE's management of hazardous waste, including waste associated with AEA activities, will be designed to be equally successful.

Sincerely,

Stephen H. Greenleigh

Stephen H. Greenleigh
Assistant General Counsel
for Environment

Proposed DOE Letter to EPA on Inapplicability of RCRA to Activities Subject to Atomic Energy Act of 1954, as Amended

✓Stephen H. Greenleigh/GC-34

In response to your draft letter addressed to Jim Rogers, Associate General Counsel at EPA, I offer the following:

We do agree that nuclear and mixed waste streams should be excluded from regulation by RCRA, with the understanding that DOE will mount a program comparable to those required under that statute. However, we have serious problems with your taking the position that, as a matter of DOE policy, the Department is opposed to regulation of non-nuclear materials at facilities operated under authority of AEA. This issue is of significant importance to require concurrence by ASEV. The position does not reflect recent experience at DOE facilities with respect to permitting by EPA or the states.

I also have problems with your view of the impact of regulations by state agenc Although the argument is valid with respect to OSHA, I don't believe that regulating environmental protection matters, that, in the main, affect the public in the vicinity of DOE operations, is quite the same as our concerns with OSHA regulations. Generally, the trend is to have federal facilities regulated by states. Additionally, a DOE public position, opposed to state regulations, has serious public relations implications for the Department as a whole and for individual facilities.

Your proposed letter also fails to indicate that the Department, through initiatives undertaken by ASEV, is now preparing to submit applications to EPA regional offices. Your letter does not reflect this effort (to which DOE has made budget commitments) nor, programmatic discussions that we have been conducting with EPA at Headquarters. Indeed, EPA is expecting to receive permit applications from nuclear facilities for non-nuclear hazardous wastes. As a minimum, Jim needs to know of our program discussions. There also is a potential for DOE being caught between EPA headquarters and their regional offices. Given the ASEV recent activity, I am puzzled by the last sentence in your first paragraph.

I suggest that we discuss this matter with the interested program offices prior to your sending the letter to Rogers.

/s/ KJ for
Thomas G. Frangos, Director
Office of Environmental Compliance
and Overview

✓
cc: B. Siebert/DP-8
J. Dieckhoner/NE-321
bcc:RCC/EV-1
LBB/EV-2
KJ/EV-11
MDix/EV-14
JDeal/EV-131 Dist:ASEV RF; OECO RF EV-10:TGFRANGOS:no'n:10/8/80

10/9/80 ✓

DOE F 1325.10
(7-79)

OFFICIAL FILE COPY

2.b.
HAZ.W.

~~Jody~~ FW 10/22 → Gale GM → Chris CK

- ASEV is apparently perturbed that it didn't have greater input to the draft letter and will bog it down by putting it into the bureaucratic process.
  - NOT much chance of it going out soon now.

looks like EV agrees with us DEO

Implementation of Resource Conservation and Recovery Act

On the administrative side, in mid-November, HQ General Counsel concluded all hazardous waste generated by any Atomic Energy Act activity was exempt from the RCRA and conveyed this position to EPA HQ. The eventual intent is for DOE to demonstrate internal comparability with the RCRA regulations. At this time, ORO has performed the necessary notification to EPA Regional Offices IV and V and has had only a computer response indicating receipt.

On the operating side, no site could be found in the 50-square mile Oak Ridge reservation that would meet the criteria for a hazardous waste landfill. Similar siting problems exist at PORT and PAD. In addition, the licensing headache in siting simple sanitary landfills has been so bad, the prospect of licensing hazardous waste landfills looks very dim; i.e., public hearings, environmental impact statements, etc. At this time, ORO plans to contract with EPA-approved commercial hazardous waste disposal firms for disposing of the non-radioactively contaminated hazardous waste and to utilize aboveground solidification/storage of the co-contaminated hazardous waste.

Prepared by JFW for Mgr's mtg. on 1-7-81

(2.b.) HAZ.W.

1-6-81

[illegible] — your copy

-1-

14

Department of Energy
Washington, D.C. 20585

FEB 17 1981

MEMORANDUM FOR THOMAS G. FRANGOS
DIRECTOR
OFFICE OF ENVIRONMENTAL COMPLIANCE AND OVERVIEW

FROM: STEPHEN [illegible] GREENLEIGH
ACTING DEPUTY GENERAL COUNSEL FOR PROGRAMS
OFFICE OF GENERAL COUNSEL

SUBJ: DOE REPORTING RESPONSIBILITIES UNDER SUPERFUND LEGISLATION

This memorandum is in response to questions which Ken Johnson of your office has raised regarding DOE's reporting responsibilities under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, P.L. 96-510, commonly known as "Superfund." The questions concern the nature and extent of any reporting requirements to which DOE may be subject under Superfund, and the relationship between Superfund's reporting provisions and DOE's previously enunciated position regarding the inapplicability of EPA's hazardous waste regulations to certain DOE programs.

1. DOE's Obligation to Report Hazardous Substance Facilities

Section 103(c) of Superfund requires that EPA, within 180 days of enactment, be notified of the existence and characteristics of certain sites at which hazardous substances are or have been stored, treated or disposed of. "Hazardous substance" is a term broadly defined in Section 101(14), but the notification requirement under Section 103(c) is limited to sites containing one particular class of hazardous substances, i.e. hazardous waste regulated by the Resource Conservation and Recovery Act (RCRA) (P.L. 94-580), as amended. A further limitation in Section 103(c) excludes from the notification requirements any facility which has been granted a RCRA hazardous waste permit or which has obtained "interim status" under EPA's RCRA regulations. Thus, the only facilities subject to the notification requirement of Section 103(c) are: 1)currently operating hazardous waste management facilities (within the meaning of RCRA) which are out of compliance with EPA's RCRA regulations, and 2) inactive facilities which previously handled RCRA regulated wastes.

as I have already noted, however, RCRA hazardous waste is but one class of the broadly defined term "hazardous substances." It is important to note that should EPA interpret its mandate broadly, it appears that a facility which is required to report under Section 103(c) could be required to report any hazardous substance found at that facility, not just RCRA hazardous waste.1/ Similarly, the requirement in Section 103(a) of Superfund to notify the National Response Center of any release of a hazardous substance into the environment would apply not just to RCRA hazardous waste but to hazardous substances as broadly defined.

2. Applicability of Notification Provisions to Atomic Energy Act (AEA) Program Facilities

The question has arisen whether DOE's hazardous waste management facilities associated with AEA programs need be reported to EPA pursuant to Section 103(c) of Superfund. As you know, DOE has previously taken the position that such facilities are not regulated by RCRA. Because, as discussed above, the applicability of the notification provisions of Section 103(c) is limited to sites containing RCRA regulated hazardous waste, it would appear that information concerning AEA program waste management facilities need not be reported to EPA.

It should be noted, however, that the act of notifying EPA of the existence and characteristics of such facilities need not constitute submission to EPA regulation of those facilities. Notification could be undertaken as a matter of comity, for a useful purpose such as the consolidation of information concerning potentially dangerous former waste disposal areas. Before any decision is taken by DOE not to disclose information concerning AEA program hazardous waste disposal site, the policy implications of such a decision should be carefully evaluated.

It is anticipated that the responsibilities addressed in this memorandum will be clarified as the regulations and guidance implementing Superfund are developed by EPA or other responsible Federal agencies. Further, the conclusions expressed above assume that DOE's position regarding the inapplicability of RCRA to our AEA program wastes is ultimately found to be correct. I will advise you of any further developments which might alter the conclusions stated above.

I would be pleased to discuss these matters with you in more detail should you desire.

1/ Under Section 102(a) of Superfund, EPA has the authority to broaden by regulation the meaning of "hazardous substance" beyond the kinds of substances listed in Section 101(14) of the legislation. Specifically, the Administrator of EPA is authorized to designate as additional hazardous substances "such elements, compounds, mixtures, solutions, and substances which when released into the environment may present substantial danger to the public health, welfare, or the environment...."

cc: Alex Fremling
Ken Johnson

(INFO.)

AW 3/27
MAT 3/30
JM 3/30
CB 4/8

Environmental Protection Branch
Weekly Activities Report
March 27, 1981

"O" Segment

All the paperwork necessary to enter into a contract with Battelle for the EIS on the potential transfer of the "O" segment to the City for Koppers has been taken care of down to routing the letter contract through the staff for approval. As of March 27, AM, we still do not have formal approval from HQ to do the statement. Battelle is ready to start as soon as we give them the word. A Battelle meeting with ERT (Koppers' environmental consultant) scheduled for March 30 will have to be cancelled because of the lack of a contract. The longer this delay continues, the more likely the Battelle team will be siphoned off to other work, thereby lengthening the delay to get a team reassembled and started once we are finally able to give them a go-ahead. (Wing)

ORGDP EIS

Copies of the transcripts form the four public scoping meetings were received from BCL this week. Also received from BCL was the EIS implementation plan. Work is proceeding satisfactorily on the project. (Travaglini)

Paducah Sanitary Landfill

The thirty day comment period for the public notice ended on March 22. In conversations with the Kentucky regulatory people we learned that they will wait approximately 5 days to make sure no petitions requesting a public hearing have been received by the Department and, if none have been, they will issue a construction permit. (Travaglini)

SUPERFUND

Comments on EPA's reporting requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, commonly known as "Superfund") were prepared for submission to Charles Campbell of Headquarters. While the financial liability requirements (what most people associate Superfund with) have minimal significance to ORO, the reporting requirements, as they now stand, have far-reaching implications. Because the exemption for Atomic Energy Act activities is much more limited than the AEA exemption for RCRA, practically all of ORO activities are subject to CERCLA. Some of the more concerning requirements include newspaper notification of releases that "have potentially injured persons," reporting past disposal practices, and, in general, reporting any suspected degradation of the environment involving the release of one pound of hazardous substances. Hazardous substance by CERCLA definition, includes lists of pollutants from RCRA, the Clean Water Act, the Clean Air Act, and the Toxic Substance Control Act. (Bird/Travaglini)

Y-12 Sanitary Landfill

Core drilling for the proposed Y-12 sanitary landfill is proceeding, with depths of acceptable soil ranging from 65 to 96 feet. (Bird)

Staffing

Gabe Marciante will be in Frankfort, KY March 27 for SRC I meetings.

RCRA file
JAW 9/17

April 13, 1981

Files

DOE REPORTING RESPONSIBILITIES UNDER SUPERFUND

The purpose of this memo is to briefly summarize ORO and ORO/contractor reporting responsibilities under the new Superfund legislation.

1. § 103(c). This section states that within 180 days after the enactment of Superfund (by June 1981), any person who owns or operates, or who at the time of disposal owned or operated, or who accepted hazardous substances for transport and selected a facility at which hazardous substances are or have been stored, treated or disposed of, shall, unless such facility has a permit issued under, or has been given interim status under, RCRA, notify EPA of the existence of such facility, specifying the amount and type of hazardous substances to be found there, and any known, suspected, or likely releases of such substances from the facility. As I understand it, DOE's position regarding what must be reported under § 103(c) is that any formerly used site at which non-AEA, RCRA-regulated hazardous waste has been stored, treated, or disposed of, will be subject to this notification requirement. Thus, DOE will assert its RCRA permit exemption under Superfund for AEA-generated waste. The distinction between reportable and non-reportable activities will be primarily drawn between radioactive and non-radioactive waste. However, non-radioactive wastes which are considered to be AEA-generated will also be exempt from the reporting requirements. These wastes are, for the most part, wastes which were generated during the time when all activities at ORO were performed under the Atomic Energy Act.

In responding to the reporting requirements, past records of storage, treatment or disposal of hazardous wastes should be consulted whenever possible. It should be emphasized that EPA is not looking for a greatly detailed gram-by-gram breakdown of hazardous substances located within our facilities; i.e., a general summary of what is located where would suffice. If no records exist in reference to a storage, treatment or disposal facility, yet it is known that hazardous wastes are located in such facility, the general rule for reporting the hazardous materials is to do "whatever a reasonable person would do under the circumstances." If a site exists which contains a mixture of AEA waste and non-AEA, RCRA-regulated hazardous waste, the non-AEA wastes should be reported whenever possible.

CC-10
ACM
4/13/81

2. § 103(a). This section states that any person in charge of a facility shall, as soon as he has knowledge of any release (other than a federally-permitted release) of a hazardous substance from such facility, immediately notify the National Response Center. DOE's position is that at this time immediate notification to the EPA is required only for releases of hazardous substances which are non-routine, serious releases which require immediate attention and response. Notification is not required at this time for releases which are incidental to the normal business operations. The definition of "federally permitted release," which is expressly excluded from the reporting requirements under the Act, includes any release of "source, special nuclear, or by-product material," as those terms are defined in the Atomic Energy Act, in compliance with a legally enforceable license, permit, regulation, or order issued pursuant to the Atomic Energy Act. Thus, we need be concerned only with non-radioactive waste under § 103(a). The phrase "legally enforceable license, permit, regulations, or order" has been interpreted to include DOE orders and guidelines. However, a serious release which would exceed permit levels should be reported to EPA.

3. FUSRAP. It is my understanding that under § 103(c), there are no reporting requirements for FUSRAP sites. The reason for this is that § 103(c) requires reporting of only RCRA-type hazardous waste. In regard to § 103(a), FUSRAP site releases should be reported to the National Response Center only if such releases are nonroutine releases into the environment resulting from DOE activities.

Original Signed By
Allen C. Moseley

CC-10:ACMoseley:mh:61214:4-13-81

Allen C. Moseley, Attorney
Office of Chief Counsel

CC-10:ACM

cc: Steve Miller, OGC
bcc: J. F. Wing, SE-331
Chris Bird, SE-331
J. L. Foutch, CC-10
D. G. Darugh, CC-10

DOE F 1325.8
(7-79)

U.S. DEPARTMENT OF ENERGY

memorandum

DATE MAY 14 1981

REPLY TO ATTN OF EP-131

0884

SUBJECT Reporting Requirements under Section 103(c) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, P.L. 96-510 (Superfund)

TO Heads of Field Organizations

Section 103(c) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, P.L. 96-510, (commonly called the "Superfund") mandates that certain persons (including Federal agencies) notify the Environmental Protection Agency (EPA) by June 9, 1981, of the existence of facilities where hazardous substances are stored, treated, or disposed of. The reporting requirements under this section apply to persons (including Federal agencies) who own or operate, or who at the time of disposal owned or operated, or a facility at which hazardous substances are or have been stored, treated, or disposed of. Persons (including Federal agencies) subject to the reporting requirements must notify EPA of the existence and location of the facilities as well as provide details on the amount and type of hazardous substances to be found there and any known, suspected, or likely releases of hazardous substances from the facilities.

In accordance with the Act, EPA has published notification requirements in the April 15, 1981 Federal Register (copy attached). The attached EPA Form 8900-1 is to be used to provide EPA with the required information.

Many of our field organizations will not be subjected to the reporting requirements under Section 103(c) because they will be covered by one or more of the statutory and administrative exemptions noted in the attached notification requirements. For example, facilities which contain hazardous substances not regulated under the Resource Conservation and Recovery Act (RCRA), do not have to report to EPA. Those DOE facilities regulated under the Atomic Energy Act of 1954, as amended (AEA), to which RCRA is not applicable, should not submit the attached form to EPA.

Facilities which do not contain hazardous substances regulated under RCRA, but which have been accorded interim status under Section 3005 of RCRA, would also be exempt from the reporting requirements. Treatment, storage, or disposal facilities which are covered by notifications to EPA filed under Section 3010 of RCRA, do not have to be reported to EPA again under Superfund. Also, sites at which less than 55 gallons (or 7.4 cubic feet) of hazardous substances have been disposed of are not subject to this notification requirement.

Each organization that will be required to report sites under Superfund should complete the EPA form and send it directly to the appropriate EPA regional office by June 9, 1981. Please provide me a copy of the completed notification form that you provide to EPA.

Completed notification forms should also be provided to this office only for all inactive DOE-owned facilities regulated under the Atomic Energy

0593

MAY 26 1981

ORIGINAL

Act that are not reported to EPA under Section 103(c) of Superfund (because of the AEA exemption), so that we can develop a Departmental inventory for planning and impact assessment purposes.

The forms should cover both radioactive and non-radioactive hazardous substances located at facilities which were not previously reported to this office under the RCRA inventory, but should not cover inactive DOE-owned radioactive waste disposal facilities under DOE's surplus facilities, or formerly utilized sites remedial action programs.

We would also like these forms by June 9, 1981.

If there are any questions, please contact C. Campbell, EP-131 (FTS 233-5684), or S. Miller, GC-34 (FTS 252-6947).

DEPatterson
D. E. Patterson, Acting Director
Operational and Environmental
Safety Division

Attachment

cc: W. Burr, EP-3
T. Frangos, EP-10

[redacted]

Addressees

R. L. McPhail, Administrator, Western Area Power Administration
A. G. Fremling, Manager, Richland Operations Office
H. E. Roser, Manager, Albuquerque Operations Office
R. H. Bauer, Manager, Chicago Operations Office
C. E. Williams, Manager, Idaho Operations Office
T. E. Wade, Deputy Manager, Nevada Operations Office
W. J. Hart, Manager, Oak Ridge Operations Office
J. La Grone, Manager, San Francisco Operations Office
R. P. Denise, Deputy Manager, Savannah River Operations Office
C. S. Carlisle, Director, FFTF Project Office
H. R. Johnson, Director, Bartlesville Energy Technology Center
A. W. Decora, Acting Director, Laramie Energy Technology Center
A. A. Pitrolo, Director, Morgantown Energy Technology Center
E. A. Sondreal, Director, Grand Forks Energy Technology Center
S. W. Chun, Acting Director, Pittsburgh Energy Technology Center
H. R. Wright, Administrator, Southeastern Power Administration
J. B. Hammett, Administrator, Southwestern Power Administration
P. Johnson, Administrator, Bonneville Power Administration
R. J. Cross, Administrator, Alaska Power Administration
R. G. Martin, Director, Naval Petroleum Reserve, California
J. P. Watson, Director, Naval Petroleum and Oil Shale Reserve, Wyoming
L. W. Caffey, Director, Clinch River Breeder Reactor Plant Project Office
H. L. Volchok, Director, Environmental Measurements Laboratory
A. C. Van Besien, Acting Director, Carbondale Mining Technology Center
Deputy Assistant Secretary for Naval Reactors for SNR and PNR
Director, Office of Uranium Resources and Enrichment for GJ

JUN 9 1981

U.S. EPA Region IV
Sites Notification
345 Courtland St. NE
Atlanta, GA 30365

Gentlemen:

CERCLA SITE NOTIFICATION FOR THE U.S. DEPARTMENT OF ENERGY'S OAK RIDGE OPERATIONS FACILITIES

As required by Section 103(c) of CERCLA, enclosed are the notification forms for DOE's facilities in Region IV.

Due to the Atomic Energy Act (AEA) authorized activities conducted by these facilities, many of the wastes handled are exempt from both RCRA and CERCLA requirements. According to 40 CFR 261.4(a.4), RCRA does not apply to "source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954, as amended, 42 U.S.C. 2011 et seq." Additionally, Section 1006(a) of RCRA provides that RCRA does not apply to any activity or substance which is subject to the AEA. DOE's position, which is currently being verified between DOE and EPA Headquarters, is that this exemption also applies to non-radioactive wastes generated by AEA authorized activities.

Section 103(c) of CERCLA requires notification of sites where RCRA-regulated wastes are stored, treated, or disposed of. Because of DOE's interpretation of the AEA exemption, notification forms are not being submitted for certain DOE sites because wastes handled at these locations are generated by AEA activities.

Several DOE facilities have sites where both RCRA-regulated and AEA-exempt wastes have been handled. These sites have been described in notification forms.

A map of the DOE Oak Ridge Reservation is provided in Enclosure 2. A summary of DOE facilities and their status in regard to Section 103(c) notification is presented below:

5643

Mailed
6/9/81

2.b.
HAZ. Waste

CONCURRENCE
RTG. SYMBOL
INITIALS/SIG.
DATE
RTG. SYMBOL
INITIALS/SIG.
DATE
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Facility	Wastes/Type Handled At Sites
Oak Ridge National Laboratory	RCRA-regulated and AEA-exempt
Y-12 Plant	RCRA-regulated and AEA-exempt
Comparative Animal Research Laboratory	RCRA-regulated and AEA-exempt
Oak Ridge Gaseous Diffusion Plant	AEA-exempt
Paducah Gaseous Diffusion Plant	AEA-exempt*
Oak Ridge Associated Universities	No sites

*(Except for the Kentucky Ordnance Works Site)

If DOE's interpretation of the exemption for AEA activities subsequently is determined to be incorrect, we will submit any additional information necessary to fulfill the Section 103(c) requirements.

If you have any questions, please contact Chris Bird of my staff at FTS 626-0847.

Sincerely,

J. F. Wing, Chief
Environmental Protection Branch

SE-331:CB

Enclosures

CC w/pertinent encl:
✓Jim Bailey, Y-12
✓Todd Butz, Y-12
✓M. Sanders, Y-12
✓T. W. Oakes, ORNL
✓Don Cameron, CARL
✓C. Conrad, UCCND/PAD
✓R. G. Jordan (ORNL, Y-12 & PAD encl. 1)
✓Chas. Campbell, HQ/EP-131/GTN
+ ✓H.E. Walburg, CARL

SE-331:CBird:jrd:60847:6/4/81

CC w/o encls:
W. H. Travis, SE-33
V. J. D'Amico, SE-30
J. A. Lenhard, ER-10
H. D. Hickman, DP-80
H. Doran Fletcher, ED-22
Allen Moseley, CC-10
Mike Mitchell, ORGDP
Bill Roach, ORAU

+ BCC:
A. Moseley, CC-10
w/all encl.

DOE F 1325.10
(7-79)

OFFICIAL FILE COPY

CONCURRENCE	
RTG. SYMBOL	SE-331
INITIALS/SIG.	CB CB
DATE	6/4/81
RTG. SYMBOL	SE-331
INITIALS/SIG.	JFW JW
DATE	6/8/81
RTG. SYMBOL	CC-10
INITIALS/SIG.	AM
DATE	6/8/81
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1467

6/17/81

Davey -

The attached letter may aid you in your discussions with the state of Tennessee regarding hazardous and radioactive waste operations at OR. The state should be made aware that we are presently assuming exemption from RCRA, and that DOE is in the process of implementing its own hazardous waste management program. I don't think we should throw this in their faces, though.

Your idea of drawing sharper distinctions between DOE's RWM + HWM programs is a good one. Certainly a review of OR's RW disposal re HW storage practices should accomplish this. The NHF should not be given too much visibility at this time.

Walt

-1
791

1216-2

NOV 19 1980

Department of Energy
Washington, D.C. 20585

MEMORANDUM FOR LEONARD A. JACOBVITS
MARTIN BAMBER
HOLGER ALBRETHSEN, JR.
IGNACIO RESENDEZ
RICHARD AMICK
WILLIAM P. SNYDER
RICHARD L. HAMES
PETER A. BERNARD
JOHN E. CUMBES
RICHARD C. FOCHT

FROM: STEPHEN H. GREENLEIGH
ASSISTANT GENERAL COUNSEL FOR ENVIRONMENT

SUBJ: COMPLIANCE WITH EPA HAZARDOUS WASTE REGULATIONS

As your managers were informed in a November 17, 1980 memorandum from the Acting Under Secretary, DOE has taken the position that EPA's hazardous waste management regulations are not applicable to DOE programs which operate under authority of the Atomic Energy Act of 1954 (AEA). Accordingly, all DOE facilities which are engaged in AEA activities and which treat, store or dispose of hazardous waste were advised by the Acting Under Secretary, for purposes of their EPA hazardous waste permit applications, to attach cover letters to the applications stating DOE's understanding that AEA program wastes are not regulated by RCRA, and stating that because of this understanding those wastes are not included in the permit applications.

This matter was discussed by William Dennison of my office at a DOE Environmental Protection Information Meeting for DOE personnel and DOE contractors, held in Germantown on November 18, 1980. In the course of that discussion an issue was raised for the first time which suggests a need for some amplification of the Acting Under Secretary's guidance. Specifically, several DOE facilities which generate AEA wastes for off-site disposal expressed concern that any failure by these facilities to comply with EPA's regulations regarding the generation and shipment of hazardous waste would create difficulties in obtaining the necessary services of waste transporters and waste recipients. If

DOE's position regarding the status of AEA program wastes is accepted by EPA, compliance with the EPA regulations would not be a legal requirement even in the case of off-site disposal of AEA wastes. Because EPA has not yet responded to DOE's position, however, it is likely that many waste transporters or disposers, as a precaution against their own potential liability should EPA not accept DOE's position, may be reluctant to accept AEA wastes not packaged and manifested in accordance with EPA requirements.

In order to avoid any risk of program disruptions pending resolution of this matter, DOE facilities which generate AEA waste for off-site disposal should for the present comply with EPA regulations to the extent believed necessary to secure the necessary services of transporters and waste recipients. This should be done in a manner consistent with DOE's position that compliance is not a legal requirement. For example, the waste description in the shipping manifests for AEA wastes should, in addition to characterizing the wastes, indicate that the wastes are believed not to be subject to EPA regulation.

Adherence to this procedure should facilitate DOE program activities without compromising the DOE legal position pending resolution of this matter with EPA. I would be pleased to discuss any further questions you may have regarding this subject.

cc: Harry Pohalem, D/US
Ed Kay, US
Tom Frangos, EV
Mike Dix, EV
Bryan Siebert, DP
Jim Dieckhoner, NE

577
-1-

1216-4

Department of Energy
Washington, D.C. 20585

November 17, 1980

MEMORANDUM FOR ASSISTANT SECRETARIES
DIRECTOR OF ENERGY RESEARCH
HEADS OF FIELD ORGANIZATIONS

FROM: WORTH BATEMAN
ACTING UNDER SECRETARY

SUBJ: COMPLIANCE WITH EPA HAZARDOUS WASTE REGULATIONS

Regulations prescribed by the Environmental Protection Agency (EPA) pursuant to the Resource Conservation and Recovery Act (RCRA) require that any DOE facility which treats, stores or disposes of hazardous waste must file Part A of the prescribed EPA hazardous waste permit application by November 19, 1980, or else cease all hazardous waste management activities at that facility. RCRA does not apply to source, special nuclear, or byproduct materials as defined by the Atomic Energy Act of 1954 (AEA). Additionally, section 1006(a) of RCRA provides that RCRA does not apply to any activity or substance which is subject to the AEA except to the extent that any RCRA requirement would not be inconsistent with the requirements of the AEA. A number of DOE offices engaged in programmatic responsibilities under authority of the AEA have requested guidance as to the significance of section 1006(a). Specifically, they have requested guidance as to what information regarding AEA program wastes should be included in their permit application.

The attached letter of November 14, 1980 from DOE's Assistant General Counsel for Environment, Stephen H. Greenleigh, to his EPA counterpart, James A. Rogers, takes the position that the application of RCRA to DOE's AEA programs would be inconsistent with the regulatory structure established by the AEA, with regard to both radioactive and nonradioactive hazardous wastes. Pending resolution of this issue with EPA and for purposes of the November 19 permit application deadline, any DOE facility engaged in AEA activities should attach a cover letter to its permit application stating DOE's understanding that AEA program wastes are not regulated by RCRA, and stating that because of this understanding those wastes are not included in the application. The letter should further indicate that should DOE's understanding subsequently be modified, the DOE facility would then furnish EPA with additional information as appropriate. The permit application should of course provide the requested information for wastes not associated with AEA programs.

577

12165

The Office of Environment will continue to inform the concerned line program offices of further developments in this area. Any questions relating to this memorandum should be referred to Thomas Frangos, Director, Office of Environmental Compliance and Overview, or to Stephen H. Greenleigh, Assistant General Counsel for Environment, as appropriate.

Attachment:
As stated

EV-10

Proposed DOE Letter to EPA on Inapplicability of RCRA to Activities Subject to Atomic Energy Act of 1954, as Amended

✓Stephen H. Greenleigh/GC-34

In response to your draft letter addressed to Jim Rogers, Associate General Counsel at EPA, I offer the following:

We do agree that nuclear and mixed waste streams should be excluded from regulation by RCRA, with the understanding that DOE will mount a program comparable to those required under that statute. However, we have serious problems with your taking the position that, as a matter of DOE policy, the Department is opposed to regulation of non-nuclear materials at facilities operated under authority of AEA. This issue is of significant importance to require concurrence by ASEV. The position does not reflect recent experience at DOE facilities with respect to permitting by EPA or the states.

I also have problems with your view of the impact of regulations by state agenc Although the argument is valid with respect to OSHA, I don't believe that regulating environmental protection matters, that, in the main, affect the public in the vicinity of DOE opprations, is quite the same as our concerns with OSHA regulations. Generally, the trend is to have federal facilities regulated by states. Additionally, a DOE public position, opposed to state regulations, has serious public relations implications for the Department as a whole and for individual facilities.

Your proposed letter also fails to indicate that the Department, through initiatives undertaken by ASEV, is now preparing to submit applications to EPA regional offices. Your letter does not reflect this effort (to which DOE has made budget commitments) nor, programmatic discussions that we have been conducting with EPA at Headquarters. Indeed, EPA is expecting to receive permit applications from nuclear facilities for non-nuclear hazardous wastes. As a minimum, Jim needs to know of our program discussions. There also is a potential for DOE being caught between EPA headquarters and their regional offices. Given the ASEV recent activity, I am puzzled by the last sentence in your first paragraph.

I suggest that we discuss this matter with the interested program offices prior to your sending the letter to Rogers.

/s/ KJ for
Thomas G. Frangos, Director
Office of Environmental Compliance
and Overview

cc: B. Siebert/DP-8
J. Dieckhoner/NE-321
bcc: RCC/EV-1
LBB/EV-2
KJ/EV-11
MDix/EV-14
JDeal/EV-131

10/9/80 ✓

Dist: ASEV RF; OECO RF EV-10:TGFRANGOS:no'n:10/8/80

OFFICIAL FILE COPY

DOE F 1325.30

2.b.
HAZ.W.

~~Jerry~~ FW 10/22 → Gale GM → Chris CB

- ASEV is apparently perturbed that it didn't have greater input to the draft letter and will bog it down by putting it into the bureaucratic process.

— NOT much chance of it going out soon now.

looks like EV agrees with us. DGO

DOE F 1325.8
(7-79)

U.S. DEPARTMENT OF ENERGY

memorandum

81 3577

DATE SEP 24 1981

REPLY TO ATTN OF DP-8

SUBJECT Resource Conservation and Recovery Act

TO
Manager, Albuquerque Operations Office
Manager, Chicago Operations Office
Manager, Idaho Operations Office
Manager, Nevada Operations Office
Manager, Oak Ridge Operations Office
Manager, Richland Operations Office
Manager, San Francisco Operations Office
Manager, Savannah River Operations Office

2541

It appears that there has been some recent questioning by EPA field offices of DOE's position on the Resource Conservation and Recovery Act of 1976 (RCRA). This memorandum reiterates DOE's position should further questions be asked.

The nuclear materials and weapons production activities of the DOE are carried out pursuant to the Atomic Energy Act. These activities generate nuclear, non-nuclear and mixed hazardous wastes. DOE's view is that the RCRA itself excluded the applicability of RCRA to activities and substances produced by Defense Programs under the AEA.

The attached copy of a memo to EPA sets forth DOE's position on this matter. As yet, EPA has not formally responded although the Secretary and the Administrator of EPA have discussed the matter.

Subject to further advice from me, DOE field offices should carry out their weapons program waste management activities in accord with this DOE position. Any request to a DOE facility by EPA or any State regulatory authority, compliance with which could be interpreted as inconsistent with this position, should not be granted without prior consultation with Headquarters. Needless to say, it is most important that wastes continue to be managed in a safe manner.

If any questions arise as to the scope of the policy in this area I would ask that you contact Steve Greenleigh.

Herman E. Roser
Assistant Secretary
for Defense Programs

Attachment

cc: W. W. Hoover, DP-20, w/attachment
F. C. Gilbert, DP-70, w/attachment

Chris, Here is E.P.A. response to some of our Questions A.E.A.

9 12-28-82
M13 ~~12-28-82~~

DEC 27 1982

File - Haz. waste DOE Facilit Oak Ridge

DEC - 8 1982 REGION IV - ATLANTA, GA

Proposed MOU Between EPA and DOE Concerning Solid & Hazardous Waste Management at DOE Facilities

Regional Administrator
Region IV

Paul C. Cahill, Director
Office of Federal Activities

We have reviewed the above referenced proposed MOU between EPA and DOE and we have the following concerns:

1. We believe it was the Congressional intent in Section 1004 (27) of RCRA that hazardous wastes that are not covered by the limited exemption for wastes that are "source, special nuclear, or by-product material" as defined by the AEA, are to be regulated by EPA/an authorized State. Further, the intent of Congress in Section 1004(4) and 6001 is unmistakably clear that all Federal facilities without exception are subject to "...all Federal, State, interstate, and local requirements, both substantive and procedural (including any requirement for permits or reporting or any provisions for injunctive relief and such sanctions as may be imposed by a court to enforce such relief), respecting control and abatement of solid waste or hazardous waste disposal in the same manner, and to the same extent, as any person is subject to such requirements, including the payment of reasonable service charges."

2. The proposed MOU would have limited usefulness - an agreement between EPA and DOE would have little or no meaning in an authorized State. All eight (8) states in Region IV are authorized for Phase I of the Federal hazardous waste program. We expect all 8 to receive final authorization by January 26, 1985. It is expected that the majority of the states across the country will have final authorization by January 26, 1985. This means that the Federal program is no longer in effect in those states. [illegible] regulations will be operating in lieu of [illegible] program.

Attached is a copy of a letter from the State of Tennessee to DOE's Oak Ridge National Laboratory. The letter outlines the States position which is that the Oak Ridge facility is subject to all State solid and hazardous waste laws and regulations. This includes the requirement for a permit, reporting, and recordkeeping. In all probability, all Region IV states will take a similar position.

3. In Section 3007(4) of RCRA, Congress clearly intended that EPA/an authorized State have access to any hazardous waste facility to ensure compliance with the EPA or the applicable authorized state laws or regulations for hazardous waste management. EPA/State access for inspections is extremely important to lend the necessary technical expertise in properly managing the waste. EPA/State access to a site will also lend credibility to any program in the public eye.

4. If exception to any regulation at a facility is indicated, and the program is authorized, the Director of an authorized state program has the clear role in making these decisions. Additionaly, any exception granted must be done in accordance with established legal and administrative procedures. This may include rulemaking in compliance with the Administrative Procedures Act at both the Federal and State level.

If you have any questions, please contact Bill Gallagher of my staff at FTS 257-3016.

Original Signed By:

Charles R. Jeter

Attachment (Oak Ridge Letter)

cc: John Skinner, Office of Solid Waste w/attachment
U.S. EPA, Washington, D.C. (WH-563)

Region IV State w/attachment
Solid Waste Directors

bcc: Dick Payne, Radiation Program
Ann Asbell, Attorney, ORC
Art Linton, Fed. Facilities Coordinator

BG 12/6
AW-RM:B.Gallagher:PLA:3016:11-8-82 Want 4042Z

AW-RM	AW-RM	OPM	AW-RM	RC	AW-RM
ANTLEY	PAYNE	LINTON	SCARBROUGH	SARGENT	~~DEVINE~~
AA 12/6	12/6	12/8 ck	J18 12/6/82	12/7/82	GH 12/7

Environmental Protection Branch
Weekly Activities Report
July 22, 1982

Segment 0 DEIS Review

Copies of the DEIS were hand carried to Mr. Stern, Mr. Greenleigh and Assistant Secretary Vaughan's executive assistant on July 20. The copies were left with a request that review proceed as expeditiously as possible. Promises were made by HQ to attempt to generate a Secretarial sign-off by Tuesday, July 27. ORO has indicated that it would like to start printing on Monday, July 26, in order to produce bound copies for Congressional distribution on August 3 (for receipt on August 4) in advance of the Notice of Availability desired for August 6. Therefore, HQ was asked to provide final comment by noon July 23. This may not occur since I was informed on July 22 that, at HQ, they don't practice concurrent reviews. Each hierarchical level does not begin its review until its sublevels have signed off. As of COB July 22, I have received all of Woodbury's comments, with Borgstrom's beginning to trickle in. Stern's may follow. Rogowsky is at Page 4-60; Greenleigh has not begun his review. It's not going to be easy. (Marciante)

DOE/HQ POSITION ON AEA-EXEMPTION FROM RCRA SHIFTS SUBSTANTIALLY

Current HQ position on the AEA-exemption has broadened significantly. "New" position would add ORNL, ORAU, and Y-12 waste management services conducted for ORNL and ORAU to the exempt list. Also, solid waste management activities would be exempted, including sanitary landfills. New position is being enunciated in a MOU to be submitted to EPA, hopefully for concurrence. If approved, a substantial number of ORO waste management facilities now subject to State/EPA regulations would be exempt. (Bird)

CERCLA (Superfund) Exemption Request Being Considered

Considerations are being given to request HQ to obtain an MOU with EPA that would exempt DOE/AEA activities from the "Catch 22" reporting requirements of CERCLA which necessitated the notification to EPA of the recent 6 Kg Portsmouth UF_6 release. Exemptions being considered include on-site releases, source, special nuclear and by-product material releases, and more reasonable de minimus quantity numbers. Current de minimus quantity is 1 lb. of source, special or by-product material. (Bird)

Y-12 Kerr Hollow Quarry - Groundwater Monitoring Requirement Waiver

Waiver request for submission to Tennessee and Region IV EPA is being finalized. Prospects look good that waiver will be granted. (Bird)

HQ (Vincent DeCarlo) Visit

Vincent DeCarlo's visit to ORO July 16 included Y-12, ORGDP, and Paducah environmental development work discussion and a tour of ORNL hazardous waste management facilities. DeCarlo indicated that a much more active HQ role in hazardous waste management activities could be expected if EPA signs the MOU concerning AEA facilities. (Bird)

1274

April 9, 1982

Mr. Charles Campbell
Office of Operational Safety
EP-131, HQ Germantown

Per our telephone conversation of April 7, 1982 in which you requested a listing of ORO facilities and their status in regards to the exemption from RCRA provided for AEA activities, the listing is described as follows:

Facility	Activities	EPA Region
Oak Ridge Gaseous Diffusion Plant	AEA	IV
Paducah Gaseous Diffusion Plant	AEA	IV
Portsmouth Gaseous Diffusion Plant	AEA	V
Feed Materials Production Center	AEA	V
Y-12 Plant	AEA, non-AEA	IV
Oak Ridge National Laboratory	AEA, non-AEA	IV
Oak Ridge Associated Universities	AEA, non-AEA	IV

If you need any further information let us know.

Chris Bird

Department of Energy
Oak Ridge Operations
P.O. Box E
Oak Ridge, Tennessee 37830

MESSAGE NO 82 1274

FACSIMILE SERVICES

3M VRC II (SIX MINUTES)
FTS. 626-1063
COMM. 615-576-1063

TYPE OR USE BLACK FELT TIP PEN ONLY

3M 9600
FTS. 626-0573
COMM. 615-576-0573

REMOVE ALL STAPLES

TELEPHONE VERIFICATION NO.
FTS. 626-1058 OR 1057
COMM. 615-576-1058

DATE: 4/9/82

FROM: CHRIS BIRD BR. OR DIV. Envr. Prot. Br. 626-0847 (TEL.)

TO: CHARLES CAMPBELL 233-5684 (TEL.)

OFFICE OR LOCATION EP-131, Germantown, HQ

FACSIMILE NO. IF KNOWN ______ ______ (VERIFICATION NO.)

THIS TRANSMITTAL CONSISTS OF 1 PAGES (EXCLUDING COVER SHEET)

APPROVED BY: Chris Bird

COMMCEN. USE ONLY

DATE & TIME SENT 09 3^{40}p OPER: JP

Chris-
Is legal
working on a
response to
this? J 9/14

TENNESSEE DEPARTMENT OF PUBLIC HEALTH
Environmental Management and Quality Assurance Administration
T.E.R.R.A. BUILDING
150 NINTH AVENUE, NORTH
NASHVILLE, TENNESSEE 37203

September 3, 1982

Mr. J.F. Wing, Chief
Environmental Protection Branch
Department of Energy
Oak Ridge Operations
P.O. Box E
Oak Ridge, Tennessee 37830

Dear Mr. Wing:

We are in receipt of your letter of July 22, 1982, to Mr. Bert Layne of our Division, in which you claim that Atomic Energy Activities are not covered by the Tennessee Hazardous Waste Management Fee Rules.

We have done a careful review of our law and regulations, the Resource Conservation and Recovery Act, and the Nuclear Regulatory Commission Regulations, and find that we do not agree with this position totally.

To clarify our position we would first point out that the Tennessee Hazardous Waste Act, Tennessee Code Annotated 53-6301 et. seq., does apply to all federal government agencies as well as the private sector. T.C.A. 53-6302 defines person to include. ". . .any department, agency, or instrumentality of the executive, legislative, and judicial branches of the federal government."

T.C.A. 53-6304(0) does exclude from the definition of "waste," ". . .source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954, as amended (68 Stat. 923)."

The Resource Conservation and Recovery Act (Public Law 94-580) in Subtitle A, Section 1004(27) also excludes from the definition of solid waste, ". . .source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954, as amended (68 Stat. 923)." Section 1006(a) states in part, "Nothing in this act shall be construed to apply to (or to authorize any State, interstate, or local authority to regulate) any activity or substance which is subject to the . . .Atomic Energy Act of 1954 (42 USC 2011 and following) except to the extent that such application (or regulation) is not inconsistent with the requirements of such Act."

While the above citations would provide a partial exemption, there are obviously other items generated by the D.O.E. operations that would not be source, special nuclear, or by-product material. Waste other than these three categories would be subject to State Law and Regulations.

Subtitle F, Section 6001 of RCRA states, "Each department, agency, and instrumentality of the executive, legislative, and judicial branches of the Federal Government (1) having jurisdiction over any solid waste management facility or disposal site, or (2) engaged in any activity resulting, or which may result, in the disposal or management of solid wastes or hazardous waste shall be subject to, and comply with, all Federal, State, interstate, and local requirements, both substantive and procedural (including any requirement for permits or reporting or any provisions for injunctive relief and such sanctions as may be imposed by a court to enforce such relief), respecting control and abatement of solid waste or hazardous waste disposal in the same manner, and to the same extent, as any person is subject to such requirements, including the payment of reasonable service charges."

Subtitle A, Section 1004(3) defines the term disposal to mean, ". . .the discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or on any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including groundwaters."

It is the position of the Division of Solid Waste Management that solid and hazardous wastes other than the three categories mentioned in the preceding definitions are subject to State Regulations and must be managed in accordance with those regulations.

The U.S. Nuclear Regulatory Commission defined the exempted categories as follows:

> Source Material - means (1) uranium or thorium, or any combination thereof, in any physical or chemical form or, (2) ores which contain by weight one-twentieth of one percent (0.05%) or more of (i) uranium, (ii) thorium or (iii) any combination thereof. Source material does not include special nuclear material.
>
> Special Nuclear Material - means (i) plutonium, uranium 233, uranium enriched in the isotope 235, and any other material which the Commission, pursuant to the provisions of section 51 of the Act, determines to be special nuclear material, but does not include source material; or (ii) any material artificially enriched by any of the foregoing but does not include source material.
>
> By-product Material - means any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material.

Any solid waste or any hazardous waste which cannot be demonstrated to fall into one of the three above categories, and disposed of in a nonnuclear disposal site on D.O.E. property, must be managed according to the Tennessee Solid Waste Act and Regulations (T.C.A. 53-4301 et. seq.) or the Tennessee Hazardous Waste Act and Regulations (T.C.A. 53-6301 et. seq.). Furthermore, any disposal of these materials on D.O.E. property will require a permit from the Commissioner of the Tennessee Department of Public Health in order to operate.

From the inspection by our Knoxville Office and your request for a waiver for groundwater monitoring, it is extremely doubtful that all waste disposed of on-site is radioactive.

We would suggest that you contact this office immediately if this assumption is incorrect, otherwise we will expect D.O.E. to begin the necessary steps to permit and properly manage the on-site disposal facilities.

Sincerely,

Bobby W. Morrison

Bobby W. Morrison
Permits and Quality Assurance
Division of Solid Waste Management

BWM/gm/3-4/3-5

cc: Anderson County Health Department
East Tennessee Regional Health Office
John Leonard, Division of Solid Waste Management
Environmental Protection Agency, Region IV

Department of Energy
Washington, D.C. 20585

[illegible] 02 1982

Mr. Paul C. Cahill
Director, Office of Federal
  Activities
Environmental Protection Agency
401 M Street, SW
Washington, DC 20460

Dear Mr. Cahill:

As you are aware, the allocation of responsibility for regulating hazardous waste management at the Atomic Energy Act facilities of the Department of Energy (DOE) has been a subject of discussion between our two agencies for some time. The Environmental Protection Agency (EPA) has previously suggested that a Memorandum of Understanding (MOU) between EPA and DOE might be a suitable method of resolving this issue authoritatively. In response to that suggestion, DOE has prepared the attached draft MOU for EPA's consideration.

The draft MOU proposes to incorporate as Appendix I a DOE Order on hazardous waste management at the affected facilities. Please note that the attached materials contain a draft Order; that draft is expected to be promulgated officially in the near future.

It is my hope that this draft MOU will prove helpful in resolving an issue which has created a certain amount of confusion among the field personnel of both DOE and EPA. I am most appreciative of your office's many efforts in recent months to minimize that confusion.

I would be pleased to discuss the attached materials with you further should you so desire.

Sincerely,

Stephen H. Greenleigh
Deputy General Counsel
  for Programs

Attachments:
  As Stated

DRAFT

MEMORANDUM OF UNDERSTANDING
BETWEEN THE
U.S. DEPARTMENT OF ENERGY
AND THE
U.S. ENVIRONMENTAL PROTECTION AGENCY

CONCERNING SOLID AND HAZARDOUS WASTE MANAGEMENT AT THE DEPARTMENT OF ENERGY'S ATOMIC ENERGY ACT ACTIVITIES

This Memorandum of Understanding (MOU) is intended to clarify the responsibility of the Department of Energy (DOE) for the management of solid and hazardous waste at DOE activities and facilities operated under authority of the Atomic Energy Act (AEA). Under the Resource Conservation and Recovery Act (RCRA), the Environmental Protection Agency (EPA) has prescribed regulations generally applicable to the management of hazardous waste activities. RCRA also establishes a program for State regulation of the management of non-hazardous solid waste. Section 1006(a) of RCRA, however, provides that that Act does not apply to any activity or substance which is subject to the AEA, except to the extent that the application of RCRA would not be inconsistent with the requirements of the AEA.

It is at DOE's AEA facilities that DOE pursues its statutory mandate under the AEA to produce nuclear materials and atomic weapons, and to perform research and development work, including work for the military application of atomic energy and for other purposes. The AEA not only requires that DOE engage in these activities, but also authorizes DOE to prescribe and enforce regulations necessary for their sound management. Section 161(i)(3) of the AEA (42 U.S.C. §2201(i)(3)), for example, authorizes DOE to prescribe regulations necessary "to govern any activity authorized pursuant to this chapter, including standards and restrictions governing the design, location and operation of facilities used in the conduct of such activity, in order to protect health and to minimize danger to life or property." This AEA regulatory authority is sufficiently broad to encompass the regulation of solid and hazardous waste management at AEA activities. On this basis, and bearing in mind the importance of these activities to the national security, the need to protect their security by minimizing unnecessary or duplicative regulation, the need to protect classified information, and the Congressional directive in section 110 of the Energy Reorganization Act of 1974 (Pub. L. 93-438) for DOE and EPA to cooperate fully in establishing interagency agreements to avoid unnecessary duplication, DOE and EPA have concluded that the application of RCRA to these activities would not be consistent with the requirements of the AEA, within the meaning of section 1006(a) of RCRA.

DRAFT

Accordingly, DOE and EPA have agreed that solid and hazardous waste management at DOE's AEA activities will be governed by appropriate DOE Orders which will prescribe a functionally equivalent program within DOE that meets the intent of RCRA. DOE Order 5480, which is attached to this MOU as Appendix I, specifies all hazardous waste management requirements applicable to DOE's AEA activities, including appropriate cross-references to EPA's RCRA regulations. That Order contemplates that any offsite transportation, treatment, storage or disposal of hazardous waste from these activities will be in accordance with EPA regulations. Implementation of the requirements of DOE Orders is the responsibility of DOE line management; DOE's Assistant Secretary for Environmental Protection, Safety and Emergency Preparedness provides an independent overview of compliance efforts, and advises the Secretary of Energy on the conformance of DOE's activities with the requirements of the Orders.

DOE will cooperate with EPA and affected States in a spirit of comity to assure that solid and hazardous waste management at DOE's AEA activities is conducted safely and in accordance with applicable requirements. DOE will notify EPA of any amendments to DOE Orders affecting the subject matter of this MOU. EPA will notify its Regional Offices and affected State solid and hazardous waste programs of the terms of this MOU.

This MOU shall be effective immediately, and shall continue in effect until revised by mutual agreement, unless terminated by either party upon 120 days notice in writing. The facilities covered by this MOU are listed in Appendix II.

U.S. Environmental Protection Agency   Date   U.S. Department of Energy   Dat

RULE 1200-1-11-.02. IDENTIFICATION AND LISTING OF HAZARDOUS WASTE

(1) General

(a) Purpose and Scope - This Rule identifies those wastes which are subject to regulation as hazardous wastes under these Rules. In this Rule:

1. Paragraph (1) defines the terms "waste" and "hazardous waste," identifies those wastes which are excluded from regulation under these Rules or portions of these Rules and establishes special management requirements for hazardous waste produced by small quantity generators and hazardous waste which is used, re-used, recycled or reclaimed.

2. Paragraph (2) sets forth the criteria used by the Department to identify characteristics of hazardous waste and to list particular hazardous wastes.

3. Paragraph (3) identifies characteristics of hazardous waste.

4. Paragraph (4) lists particular hazardous wastes.

(b) Definition of Waste

1. A "waste" is any garbage, refuse, sludge or any other waste material which is not excluded under part (d)1 of this paragraph.

2. An "other waste material" is any solid, liquid, semi-solid or contained gaseous material, resulting from industrial, commercial, mining or agricultural operations, or from community activities which:

(i) Is discarded or is being accumulated, stored or physically, chemically or biologically treated prior to being discarded; or

(ii) Has served its original intended use and sometimes is discarded; or

(iii) Is a manufacturing or mining by-product and sometimes is discarded.

3. A material is "discarded" if it is abandoned (and not beneficially or legitimately used, re-used, reclaimed or recycled) by being subjected to:

(i) Disposal; or

(ii) Burning or incineration, except where the material is being burned as a fuel for the purpose of recovering usable energy; or

(iii) Physical, chemical, or biological treatment (other than burning or incineration) in lieu of or prior to disposal.

4. A "manufacturing or mining by-product" is a material that is not one of the primary products of a particular manufacturing or mining

(10) "Open Burning" - The burning of any matter under such conditions that the products of combustion are emitted directly into the open atmosphere.

(11) "Open Dumping" - The depositing of solid wastes into a body or stream of water or onto the surface of the ground without compacting the wastes and covering with suitable material to a depth and at such time intervals as prescribed in these regulations.

(12) "Person" - Any and all persons, natural or artificial, including any individual, firm or association, and municipal or private corporation organized or existing under the laws of this State or any other state, and any governmental agency or county of this State.

(13) "Refuse" - Putrescible and nonputrescible solid wastes except body wastes, including, but not limited to, garbage, animal carcasses, rubbish, incinerator residue, street cleanings, and industrial waste.

(14) "Rubbish" - Nonputrescible solid wastes, consisting of both combustible and noncombustible wastes, such as, but not necessarily limited to, paper, cardboard, tin cans, yard clippings, wood, glass, bedding, crockery, plastics, rubber by-products, or litter of any kind.

(15) "Solid Waste" - Garbage, refuse, and other discarded solid materials, including solid waste materials resulting from industrial, commercial, and agricultural operations, and from community activities, but does not include solids or dissolved material in domestic sewage or other significant pollutants in water resources, such as silt, dissolved or suspended solids in industrial waste water effluents, dissolved materials in irrigation return flows or other common water pollutants.

suspended in waters but not deposited ments.

(16) "Solid Waste Disposal System" - The relationship of the coordinated activities of and resources for processing and disposal of solid wastes within a common geographical area and under the supervision of any person or persons engaging in such activities.

(17) "Solid Waste Processing" - An operation for the purpose of modifying the characteristics or properties of solid wastes to facilitate transportation or disposal of solid wastes including, but not necessarily limited to, incineration, composting, separation, grinding, shredding, and volume reduction.

(18) "Solid Waste Disposal" - The process of placing, confining, compacting, or covering solid waste except when such solid waste is for reuse, removal, reclamation, or salvage.

(19) "Transfer Station" - An approved place for consolidation or temporary storage of solid waste prior to transportation to a processing operation or the final disposal site.

(20) "Household" - Those who dwell under the same roof and compose a family.

If the contaminated sediments are considered "solid waste", then #18 defines the filling in of the creek bed as solid waste disposal.

RULE 1200-1-7-.02 Registration of Disposal or Processing Operation.

(1) Registration Required - No person, except as herein specified, shall operate or maintain a solid waste processing facility or disposal facility or site within the State of Tennessee without making application for and receiving acknowledgement from the Commissioner. It is the intent of this section to exempt from registration the individual householder disposing of solid waste from his own household upon his own land providing this does not create a public nuisance.

(2) Registration Procedures - The procedure for obtainng approval of such facilities is established by the following sequence:

(a) A feasibility study as provided by Rule 1200-1-7-.04 must be received and approved by the Commissioner.

(b) The proposed site locations shall be evaluated by the Department and written notice of the findings shall be transmitted to the proposed registrant.

(c) As per Rules 1200-1-7-.05 and -.06, construction and operational plans shall be submitted to the Department for review. These plans shall be reviewed for conformity with the Regulations with consideration of any restrictions imposed by the Department's on-site evaluation.

(d) Application for registration to operate or maintain a solid waste processing facility or disposal site shall be made in writing to the Commissioner at least sixty (60) days, but no more than one-hundred eighty (180) days, prior to the starting of operation. After 180 days the application shall be resubmitted if operation has not begun by that time. Such application shall be on forms furnished by the Department. Written acknowledgement of registration shall be received before operation is started.

(3) Change of Ownership - In the event of an intended change of ownership of a solid waste processing facility or a solid waste disposal facility or site, a written application for registration shall be made to the Commissioner by the proposed new owner at least sixty (60) days prior to the proposed change of ownership.

RULE 1200-1-7-.03 Application for Federal, State, or Other Grants and Loans.

(1) All applications made by Tennessee counties, cities, towns, municipalities, or any combination thereof for federal, state or other grants and loans for assistance in designing, acquiring, constructing, altering, or operating solid waste processing facilities and disposal facilities or site shall be submitted to the Department for review prior to their submission to the granting agency.

5. Daily Cover - At least six (6) inches of compacted cover material shall be placed on all exposed solid waste by the end of each working day.

6. Intermediate Cover - In all but the final lift of a sanitary landfill twelve (12) inches of compacted cover material shall be placed on all surfaces which will be left exposed for a period of over one month.

7. Final Cover - A depth of at least twenty-four (24) inches of compacted cover material shall be placed on the fill not later than one (1) week after final lift is completed. In order to prevent erosion and surface deterioration the final cover shall be stabilized immediately to the satisfaction of the Department.

8. Open Burning - No garbage or refuse containing garbage shall be burned at the sanitary landfill site. Open burning of tree limbs, brush, excelsior, dunnage, and other items of comparable combusion characteristics may be performed but shall comply with requirements of the Tennessee Air Pollution Control Regulations or local regulations.

9. Salvage Operations - Salvaging shall not be permitted at the working face of a landfill site or at any place within a site that interferes with prompt sanitary disposal of solid waste. Salvaging when performed shall be such that no hazard to the public health or safety shall be created. Before any salvage operation is begun, approval of the operation shall be made by the Department.

10. Handling of Special Wastes - Dead animals, sewage solids or liquids, and other materials which are either hazardous or hard to manage shall be disposed of in a sanitary landfill only if special provisions are made for such disposal and are approved by the Department.

11. Vector Control - Conditions unfavorable for the production of insects and rodents shall be maintained by carrying out routine sanitary landfilling operations promptly in a systematic manner. Supplemental vector control measures shall be instituted whenever necessary.

12. Dust Control - Dust control measures shall be taken at a landfill site to prevent dust from creating a nuisance or safety hazard to adjacent landowners, or to people engaged in supervising, operating and using the site.

13. Supervision of Operation - A sanitary landfill shall be operated under the supervision of a responsible individual who is thoroughly familiar with the operating procedures for the specific landfill under consideration.

14. Domestic Animals - Domestic animals shall be excluded from the site.

11. "Constituent" or "hazardous waste constituent" means a constituent which caused the Commissioner to list the hazardous waste in Rule 1200-1-11-.02(4), or a constituent listed in Table 1 of Rule 1200-1-11-.02(3)(e).

12. "Container" means any portable device in which a material is stored, transported, treated, disposed of, or otherwise handled.

13. "Contingency plan" means a document setting out an organized, planned, and coordinated course of action to be followed in case of a fire, explosion, or release of hazardous waste or hazardous waste constituents which could threaten public health or the environment.

14. "Department" means the Tennessee Department of Public Health.

15. "Designated facility" means a hazardous waste treatment, storage, or disposal facility which has received a permit (or a facility with interim status) in accordance with the requirements of Rule 1200-1-11-.07 (if in this state), or which has received authorization to manage hazardous waste by another State or EPA (if out-of-state), that has been designated on the manifest by the generator pursuant to Rule 1200-1-11-.03(3)(a).

16. "Dike" means an embankment or ridge of either natural or man-made materials used to prevent the movement of liquids, sludges, solids, or other materials.

17. "Discharge" or "hazardous waste discharge" means the accidental or intentional spilling, leaking, pumping, pouring, emitting, emptying, or dumping of hazardous waste into or on any land or water.

18. "Disposal" means the final disposition of hazardous waste into or onto land, water, or air. This shall include the discharge, deposit, injection, dumping, spilling, leaking, or placing of such waste into or on any land or water so that such waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including ground waters.

19. "Disposal facility or site" means the location where the final disposition of hazardous waste occurs.

20. "DOT" means the U.S. Department of Transportation.

21. "Elementary neutralization unit" means a device which:

    (i) Is used for neutralizing wastes which are hazardous wastes only because they exhibit the corrosivity characteristic defined in Rule 1200-1-11-.02(3)(c), or are listed in Rule 1200-1-11-.02(4) only for this reason; and

    (ii) Meets the definition of tank, container, transport vehicle, or vessel in this subparagraph.

22. "EPA" means the U.S. Environmental Protection Agency.

54. "New hazardous waste management facility" or "new facility" means a facility which began operation, or for which construction commenced after the date on which one or more of the hazardous wastes handled or to be handled by the facility first become subject to regulation under rules promulgated under the Act. (See also "existing hazardous waste management facility".)

55. "On-site" means the same or geographically contiguous property which may be divided by public or private right-of-way, provided the entrance and exit between the properties is at a cross-roads intersection, and access is by crossing as opposed to going along, the right-of-way. Non-contiguous properties owned by the same person but connected by a right-of-way which he controls and to which the public does not have access, is also considered on-site property.

56. "Open burning" means the combustion of any material without the following characteristics:

(i) Control of combustion air to maintain adequate temperature for efficient combustion,

(ii) Containment of the combustion-reaction in an enclosed device to provide sufficient residence time and mixing for complete combustion, and

(iii) Control of emission of the gaseous combustion products. (See also "incineration" and "thermal treatment".)

57. "Operator" means the person responsible for the overall operation of a facility.

58. "Owner" means the person who owns a facility or part of a facility.

59. "Partial closure" means the closure of a discrete part of a facility in accordance with the applicable closure requirements of Rules 1200-1-11-.05 or 1200-1-11-.06. For example, partial closure may include the closure of a trench, a unit operation, a landfill cell, or a pit, while other parts of the same facility continue in operation or will be placed in operation in the future.

60. "Person" means any and all persons, natural or artifical, including any individual firm, or association, and municipal or private corporation organized or existing under the laws of this state or any other state, and any governmental agency or county of this state and any department, agency, or instrumentality of the executive, legislative, and judicial branches of the federal government.

61. "Personnel" or "facility personnel" means all persons who work at, or oversee the operations of, a hazardous waste facility, and whose actions or failure to act may result in noncompliance with the requirements of Rules 1200-1-11-.05 or 1200-1-11-.06.

62. "Pile" means any non-containerized accumulation of solid, nonflowing hazardous waste that is used for treatment or storage.

63. "Point source" means any discernible, confined, and discrete conveyance, including, but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture.

64. "PSC" means the Tennessee Public Service Commission.

65. "Publicly owned treatment works" or "POTW" means any device or system used in the treatment (including recycling and reclamation) of municipal sewage or industrial wastes of a liquid nature which is owned by the State or a municipality. This definition includes sewers, pipes, or other conveyances only if they convey wastewater to a POTW providing treatment.

66. "Representative sample" means a sample of a universe or whole (e.g., waste pile, lagoon, ground water) which can be expected to exhibit the average properties of the universe or whole.

67. "Run-off" means any rainwater, leachate, or other liquid that drains over land from any part of a facility.

68. "Run-on" means any rainwater, leachate, or other liquid that drains over land onto any part of a facility.

69. "Saturated zone" or "zone of saturation" means that part of the earth's crust in which all voids are filled with water.

70. "Sludge" means any solid, semi-solid, or liquid waste generated from a municipal, commercial, or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility exclusive of the treated effluent from a wastewater treatment plant.

71. "Spill" means the accidental spilling, leaking, pumping, pouring, emitting, or dumping of hazardous wastes or materials which, when spilled, become hazardous wastes into or on any land or water.

72. "State" means the State of Tennessee.

73. "Storage" means the interim containment of hazardous waste, in an approved manner, after generation and prior to disposal.

74. "Storage facility" means a location at which a hazardous waste is subjected to storage.

75. "Surface impoundment" or "impoundment" means a facility or part of a facility which is a natural topographic depression, man-made excavation, or diked area formed primarily of earthen materials (although it may be lined with man-made materials), which is designed to hold an accumulation of liquid wastes or wastes containing free liquids, and which is not an injection well. Examples of surface impoundments are holding, storage, settling, and aeration pits, ponds, and lagoons.

Table I

Maximum Concentration of Contaminants for Characteristic of EP Toxicity

Hazardous Waste Code	Contaminant	Maximum Concentration (milligrams per liter)
D004	Arsenic	5.0
D005	Barium	100.0
D006	Cadmium	1.0
D007	Chromium (VI)	5.0
D008	Lead	5.0
D009	Mercury	0.2
D010	Selenium	1.0
D011	Silver	5.0
D012	Endrin (1,2,3,4,10,10-hexachloro-1, 7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1, 4-endo, endo-5,8-dimethano naphthalene)	0.02
D013	Lindane (1,2,3,4,5,6-hexachlorocyclohexane, gamma isomer)	0.4
D014	Methoxychlor (1,1,1-Trichloro-2, 2-bis (p-methoxyphenyl)ethane)	10.0
D015	Toxaphene ($C_{10}H_{10}Cl_8$, Technical chlorinated camphene, 67-69 percent chlorine)	0.5
D016	2,4-D, (2,4-Dichlorophenoxyacetic acid)	10.0
D017	2,4,5-TP Silvex (2,4,5-Trichlorophenoxypropionic acid)	1.0

(4) Lists of Hazardous Wastes

(a) General

1. A waste is a hazardous waste if it is listed in this paragraph, unless it has been exluded from this list under Rule 1200-1-11-.01(3).

2. The Commissioner will indicate his basis for listing the classes or types of wastes listed in this paragraph by employing one or more of the following Hazard Codes:

Ignitable Waste	(I)
Corrosive Waste	(C)
Reactive Waste	(R)
EP Toxic Waste	(E)
Acute Hazardous Waste	(H)
Toxic Waste	(T)

Appendix .02/D identifies the constituent which caused the Commissioner to list the waste as an EP Toxic Waste (E) or Toxic Waste (T) in subparagraphs (b) and (c) of this paragraph.

	formulation of ink from pigments, driers, soaps, and stabilizers containing chromium and lead.	
Veterinary Pharmaceuticals:		
K084	Wastewater treatment sludges generated during the production of veterinary pharmaceuticals from arsenic or organoarsenic compounds.	(T)

2. Compliance Dates

(i) Those hazardous wastes listed in part 1 of this subparagraph with codes K001 through K011, K013 through K052, K060 through K062, K064 through K069, K071, K073, K083 through K088, K090, and K091 shall become subject to the requirements of Rules 1200-1-11-.03 through 1200-1-11-.07 on the effective date of these Rules.

(ii) Except where a compliance date may be specified based on the effective date of these Rules (e.g., generator notification in Rule 1200-1-11-.03(2)), those hazardous wastes listed in part 1 of this subparagraph with codes K093 through K100 shall become subject to the requirements of Rules 1200-1-11-.03 through 1200-1-11-.07 on May 12, 1981.

(d) Discarded Commercial Chemical Products, Off-specification Species, Container Residues, and Spill Residues Thereof

1. Listings - The following materials or items are hazardous wastes if and when they are discarded or intended to be discarded:

(i) Any commercial chemical product, or manufacturing chemical intermediate having the generic name listed in subparts (v) or (vi) of this part.

(ii) Any off-specification commercial chemical product or manufacturing chemical intermediate which, if it met specifications, would have the generic name listed in subparts (v) or (vi) of this part.

(iii) Any residue remaining in a container or an inner liner removed from a container that has held any commerical chemical product or manufacturing chemical intermediate having the generic name listed in subpart (v) of this part, unless the container is empty as defined in subpart (1)(g)2(iii) of this Rule. (Comment: Unless the residue is being beneficially used or reused, or legitimately recycled or reclaimed; or being accumulated, stored, transported or treatment prior to such use, re-use, recycling or reclamation, the Department considers the residue to be intended for discard, and thus a hazardous waste. An example of a legitimate re-use of the residue would be where the residue remains in the container and the container is used to hold the same commercial chemical product or manufacturing chemical intermediate it previously held. An example of the discard of the residue would be where the drum is sent to a drum reconditioner who reconditions the drum but discards the residue.)

(iv) Any residue or contaminated soil, water or other debris resulting from the cleanup of a spill, into or on any land or water, of any commercial chemical product or manufacturing chemical intermediate having the generic name listed in subparts (v) or (vi) of this part.

(Comment: The phrase "commercial chemical product or manufacturing chemical intermediate having the generic name listed in. . ." refers to a chemical substance which is manufactured or formulated for commercial or manufacturing use which consists of the commercially pure grade of the chemical, any technical grades of the chemical that are produced or marketed, and all formulations in which the chemical is the sole active ingredient. It does not refer to a material, such as a manufacturing process waste, that contains any of the substances listed in subparts (v) or (vi) of this part. Where a manufacturing process waste is deemed to be a hazardous waste because it contains a substance listed in subparts (v) or (vi), such waste will be listed in either subparagraphs (b) or (c) of this paragraph or will be identified as a hazardous waste by the characteristics set forth in paragraph (3) of this Rule.

(v) The commercial chemical products or manufacturing chemical intermediates, referred to in subparts (i) through (iv) of this part, are identified as acute hazardous wastes (H) and are subject to the small quantity exclusion defined in part (1)(e)5 of this Rule. (Comment: For the convenience of the regulated community the primary hazardous properties of these materials have been indicated by the letters T (Toxicity), and R (Reactivity). Absence of a letter indicates that the compound only is listed for acute toxicity.) These wastes and their corresponding Hazardous Waste Codes are:

Hazardous[1] Waste Code	Substance
P023	Acetaldehyde, chloro-
P002	Acetamide, N-(aminothioxomethyl)-
P057	Acetamide, 2-fluoro-
P058	Acetic acid, fluoro-, sodium salt
P066	Acetimidic acid, N-((methylcarbamoyl)oxy)thio-, methyl ester
P001	3-(alpha-acetonylbenzyl)-4-hydroxycoumarin and salts
P002	1-Acetyl-2-thiourea
P003	Acrolein
P070	Aldicarb
P004	Aldrin
P005	Allyl alcohol
P006	Aluminum phosphide
P007	5-(Aminomethyl)-3-isoxazolol
P008	4-aAminopyridine
P009	Ammonium picrate (R)

→ Chris

Department of Energy
Oak Ridge Operations
P.O. Box E
Oak Ridge, Tennessee 37830

9/21/82

Tennessee Department of Public Health
Environmental Management and
  Quality Assurance Administration
ATTN: Bobby W. Morrison
  Division of Solid Waste Management
T.E.R.R.A. Building
150 Ninth Avenue, North
Nashville, Tennessee 37203

Gentlemen:

COMPLIANCE WITH TENNESSEE HAZARDOUS WASTE ACT

This letter is in response to your letter of September 3, 1982 to Mr. J. F. Wing, Chief of the Environmental Protection Branch of the Oak Ridge Operations Office (ORO), requesting that DOE begin the necessary steps to secure state permits for ORO's on-site disposal facilities.

As you mentioned in your letter of September 3, 1982, the Resource Conservation and Recovery Act (RCRA) does not apply to "source, special nuclear or by-product material as defined by the Atomic Energy Act of 1954, as amended, 42 U.S.C. 2011 et seq." Additionally, § 1006(a) of RCRA does not apply to any activity or substance which is subject to the Atomic Energy Act of 1954. Your letter focused on the exemption for substances and failed to consider the exemption for activities. As Mr. Wing stated in his letter of July 22, 1982, to Mr. Bert Layne of your division, the facilities referenced on page 1 of the letter are considered exempt from hazardous waste regulations due to the exemption provided for Atomic Energy Act activities. The basis for this exemption is that all wastes at the referenced facilities are generated by activities which are authorized by, and subject to, the Atomic Energy Act of 1954. At our faciliity that is not engaged exclusively in AEA activities, Oak Ridge National Laboratory, we have applied for permits for non-AEA waste disposal.

It is our opinion that the AEA activities exemption applies to state hazardous waste programs as well as the federal hazardous waste program. The basis for this position is that the application of state hazardous waste management regulations to DOE atomic energy activities would be duplicative and inconsistent with the

9/20/82

requirements of the Atomic Energy Act and with DOE's responsibilities under that statute, because the Atomic Energy Act itself establishes a regulatory framework by which DOE, as successor to the Atomic Energy Commission, is authorized to prescribe and enforce regulations and other requirements necessary for the sound management of its AEA activities.

In reference to your assumption in your September 3 letter that all waste disposed of on-site is not radioactive, this statement is certainly true. However, we believe that § 1006(a) of RCRA must be read in conjunction with the Atomic Energy Act to exclude non-radioactive as well as radioactive Atomic Energy Act program wastes from state and federal regulatory coverage. Had the legislative intent been to apply § 1006(a)'s exclusionary effect only to radioactive materials, Congress would have chosen language having only that narrow effect. Instead, § 1006(a) is broadly drafted to exclude from RCRA's coverage "any activity" which is subject to the AEA, to the extent that the application of RCRA would be inconsistent. Even the mere possibility that a state or federal regulatory agency's activities could interfere with the operations at our facilities, when measured against the national defense implications of DOE's activities, argues for recognition of the preemptive effect of the Atomic Energy Act regulatory scheme for non-radioactive as well as radioactive waste.

Recognizing the good faith of the Tennessee Department of Public Health, and particularly the Division of Solid Waste Management, I wish to emphasize that ORO is committed to the sound management of all activities, including waste disposal, conducted under the Atomic Energy Act. We certainly plan to cooperate with your office in every way possible to ensure that our on-site disposal facilities are properly and safely managed.

Because the issue of RCRA applicability to our AEA activities is a matter of statutory interpretation, if you disagree with our opinion, it might be helpful for your counsel to contact either me (at 615-576-1204) or Allen Moseley (at 615-576-1214). Through a telephone conversation or meeting, we may be able to reach a common basis of understanding.

Sincerely,

James L. Foutch

James L. Foutch
Deputy Chief Counsel
for Legal Services

CC-10:ACM

cc: J. F. Wing, SE-331
Chris Bird, SE-331

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV - ATLANTA, GA

E: DEC - 8 1982

UBJECT: Proposed MOU Between EPA and DOE Concerning Solid & Hazardous Waste Management at DOE Facilities

ROM: Regional Administrator
Region IV

TO: Paul C. Cahill, Director
Office of Federal Activities

We have reviewed the above referenced proposed MOU between EPA and DOE and we have the following concerns:

9

1. We believe it was the Congressional intent in Section 1004 (27) of RCRA that hazardous wastes that are not covered by the limited exemption for wastes that are "source, special nuclear, or by-product material" as defined by the AEA, are to be regulated by EPA/an authorized State. Further, the intent of Congress in Section 1004(4) and 6001 is unmistakably clear that all Federal facilities without exception are subject to "...all Federal, State, interstate, and local requirements, both substantive and procedural (including any requirement for permits or reporting or any provisions for injunctive relief and such sanctions as may be imposed by a court to enforce such relief), respecting control and abatement of solid waste or hazardous waste disposal in the same manner, and to the same extent, as any person is subject to such requirements, including the payment of reasonable service charges."

2. The proposed MOU would have limited usefulness - an agreement between EPA and DOE would have little or no meaning in an authorized State. All eight (8) states in Region IV are authorized for Phase I of the Federal hazardous waste program. We expect all 8 to receive final authorization by January 26, 1985. It is expected that the majority of the states across the country will have final authorization by January 26, 1985. This means that the Federal program is no longer in effect in those states. The State laws and regulations will be operating in lieu of the Federal program.

   Attached is a copy of a letter from the State of Tennessee to DOE's Oak Ridge National Laboratory. The letter outlines the States position which is that the Oak Ridge facility is subject to all State solid and hazardous waste laws and regulations. This includes the requirement for a permit, reporting, and recordkeeping. In all probability, all Region IV states will take a similar position.

3. In Section 3007(4) of RCRA, Congress clearly intended that EPA/an authorized State have access to any hazardous waste facility to ensure compliance with the EPA or the applicable authorized state laws or regulations for hazardous waste management. EPA/State access for inspections is extremely important to lend the necessary technical expertise in properly managing the waste. EPA/State access to a site will also lend credibility to any program in the public eye.

4. If exception to any regulation at a facility is indicated, and the program is authorized, the Director of an authorized state program has the clear role in making these decisions. Additionaly, any exception granted must be done in accordance with established legal and administrative procedures. This may include rulemaking in compliance with the Administrative Procedures Act at both the Federal and State level.

If you have any questions, please contact Bill Gallagher of my staff at FTS 257-3016.

Charles R. Jeter

Attachment (Oak Ridge Letter)

cc: John Skinner, Office of Solid Waste w/attachment
U.S. EPA, Washington, D.C. (WH-563)

Region IV State w/attachment
Solid Waste Directors

20

Department of Energy
Oak Ridge Operations
P.O. Box E
Oak Ridge, Tennessee 37830

March 18, 1983

Stan S. Stief, Acting Chief, Environmental Protection Branch, SE-331

NOTIFICATION OF UNAUTHORIZED RELEASES AND MERCURY CONTAMINATED AREAS RESULTING FROM PAST Y-12 OPERATIONS AS REQUIRED BY CERCLA

Based on information being made available concerning the mercury releases from former Y-12 Plant operations, I believe that ORO has certain responsibilities mandated by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, otherwise known as Superfund) that have not been executed to date.

Section 103 of CERCLA specifies notification requirements (and criminal penalties for not fulfilling these requirements) concerning both releases of hazardous substances and information describing the existence of areas contaminated with certain hazardous substances as the result of past practices.

On June 9, 1981, we provided EPA initial site notification forms describing sites containing hazardous materials as defined by CERCLA. On September 23, 1982, a more detailed description of these sites were submitted to both EPA and the Tennessee Division of Solid Waste Management.

The only explicit indication of mercury contamination presented in the information submitted to EPA and the State as required by CERCLA was at the Chestnut Ridge Sludge Basin site, which contains mercury contaminated dredgings from New Hope Pond. In considering the additional information that I have been made aware of concerning the mercury releases from Y-12 operations and the subsequent mercury contamination of both New Hope Pond (NHP) and East Fork Poplar Creek (EFPC), I believe ORO must notify EPA formally according to the CERCLA format of these areas contaminated with mercury.

In addition, the recent State allegations (March 18, 1983) that mercury contaminated sediments have been incorporated into Oak Ridge residential garden plots could conceivably be subject to CERCLA notification and even remedial action requirements, if the allegations prove to be true.

In order to assure that ORO is meeting its CERCLA responsibilities, I recommend that an investigation be conducted concerning the allegations of EFPC sediments being used in garden plots. In addition, the mercury release information being submitted to the Appalachian Observer and the State should be incorporated into formal CERCLA Section 103 notifications to EPA describing the mercury contamination: (1) under Y-12 Plant structures, (2) in New Hope Pond sediments, and (3) in East Fork Poplar Creek sediments.

Chris Bird

Chris Bird
Environmental Protection Branch
Safety & Environmental Control Division

SE-331:CB

cc: J. L. Foutch, CC-10

U.S. DEPARTMENT OF ENERGY

memorandum

8822

DATE MAY 1 1 1983

REPLY TO ATTN OF EP-323

SUBJECT Reporting Requirements Under Section 103(c) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, P.L. 96-510

TO Heads of Field Organizations

This Office has previously asked field organizations to complete the form published in the Federal Register on April 15, 1981, for all Department facilities subject to the reporting requirements under final Environmental Protection Agency (EPA) regulations (46 F.R. 22144) (April 15, 1981), which implement Section 103(c) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, P.L. 96-510 (CERCLA). For non-Atomic Energy Act (AEA)-regulated facilities, we asked the field organizations to submit the original form to EPA and to provide copies to this Office. For AEA-regulated facilities, we specified that the completed original form should be submitted to this Office.

The responses received to our prior memos (May 14, 1981, and January 19, 1983) were limited, and we are unclear whether the field organizations may have reported to EPA without sending us copies of the submissions.

Accordingly, I am asking that all field organizations complete and submit directly to this Office the attached EPA form for all Department inactive sites under their control at which hazardous waste (i.e., waste considered to be hazardous under the Resource Conservation and Recovery Act, or under DOE Order 5480.2) is present. This information will establish a national inventory of waste sites at DOE. Please submit this information by July 1, 1983, and indicate whether this information was previously furnished to EPA.

There appears to be some uncertainty on the part of the field organizations concerning the reporting requirements for AEA-regulated DOE facilities under Section 103(c). The Environmental Protection Agency has not yet expressed any views on DOE's position that AEA-regulated facilities are exempt from the requirements of the Resource Conservation and Recovery Act. The outcome of these deliberations will not, however, affect the reporting requirements for AEA-regulated facilities under CERCLA. The Department has not asserted any exemption from the reporting of inactive hazardous waste sites under Section 103(c) for any of its AEA-regulated facilities. The separate instruction in our previous memos for the handling of completed EPA forms for AEA-regulated facilities was provided to give us an opportunity to review the data prior to submission to EPA.

If there are any questions, please call Vince DeCarlo, EP-323, FTS: 233-5684 or Steve Miller, GC-34, FTS: 252-6947.

William A. Vaughan

William A. Vaughan
Assistant Secretary
Environmental Protection, Safety,
and Emergency Preparedness

Attachment

ORIGINAL

Anderson Co.
DOE-Y-12

Mike

TENNESSEE DEPARTMENT OF PUBLIC HEALTH

OFFICE CORRESPONDENCE

FROM	TO	DATE

DATE: 1/10/83

TO: Mike Apple

FROM: John Leonard

SUBJECT: Regulation of the Department of Energy's (DOE) Facilities Under the "Tennessee Hazardous Waste Management Act."

As was discussed with you last month, this office needs some direction as to our regulatory authority at the referenced facilities. I am enclosing an informational report regarding some of the hazardous waste treatment and disposal practices being utilized at the Y-12 facility located in Anderson County.

Before we proceed any further into this matter, I am requesting that the Division obtain a legal opinion as to our regulatory authority. DOE's opinion was expressed to EPA by Stephen H. Greenleigh, DOE attorney, in his letter of 1980 (copy enclosed). As far as I have been able to determine, EPA has not responded with a definite opinion.

Additional information on hazardous waste sites at the Y-12 facility is available on the "Report of Potential Hazardous Waste Disposal Facility" forms submitted to your office under your Superfund program.

Your help in this matter will be appreciated.

J.L.

JLL/ekj

Enclosures: Report on Y-12 facilities
Letter - DOE to EPA

BWS 1-20
KDC ✓
~~FCL~~
ACM ✓
BWS ✓
cc FKC 1/25
File DOE-Y-12

HAZARDOUS WASTE INFORMATION FINDINGS

NAME OF FACILITY
The United States Department of Energy's
Y-12 Facility

I. D. NUMBER
No Registration Number due to the fact that the facilities have not notified as hazardous waste facilities.

ADDRESS AND LOCATION
The main facility is located at the junction of Bear Creek Road and Scarboro Road in Anderson County.

OWNER/OPERATOR/PRINCIPAL CONTACT
U.S. Department of Energy
Mr. Chris Bird-Environmental Protection Branch-U.S. D.O.E

MAILING ADDRESS
U.S. Department of Energy
Attention: Chris Bird
Environmental Protection Branch
P.O. Box E
Oak Ridge, Tennessee 37830

TELEPHONE
(615) 576-0847

DATE/TIME OF VISIT
December 7, 1982 - 11:00 A.M. E.S.T.

INFORMATION PREPARED BY:
Mark Burris, Environmental Engineer
Division of Solid Waste Management
Tennessee Department of Public Health
1522 Cherokee Trail
Knoxville, Tennessee 37920
(615) 546-9221

NAME(S) OF PARTICIPANTS/TITLES/AFFILIATIONS
Chris Bird, Environmental Protection Branch - U.S. Department of Energy
Rick Brown, Environmental Engineer, Division of Solid Waste Management
Mark Burris, Environmental Engineer, Division of Solid Waste Management

PURPOSE OF VISIT
The purpose of this visit was to gather information to determine the applicable requirements of the *Rules Governing Hazardous Waste Management in Tennessee* which apply to this facility.

FACILITY DESCRIPTION
The U.S. Department of Energy Y-12 facility is involved with the production of nuclear weapons components for the national defense. The Y-12 facility's manufacturing processes primarily consist of metal parts fabrication and metal plating, etc., among

various other operations. These operations generate hazardous wastes in the forms of spent solvents, plating sludges containing heavy metals, and waste acids/caustics.

FINDINGS

The first major active area of concern involves the S-3 percolation/evaporation ponds. The four-celled S-3 ponds are located at the western end of the facility approximately 100 ft. north of Bear Creek. This series of hazardous waste unlined surface impoundments contains solvents, plating/pickling wastes and acids/caustics. Additionally, some quantities of depleted radioactive materials are present in these impoundments. The pH in these impoundments usually range from 1.0 - 3.0. There is relatively little sediment in the impoundments due to the fact that the low pH causes most of the material constituents to remain in solution. The S-3 percolation/evaporation ponds have been in existence since 1951. These ponds are visibly leaking from the sides of the ponds' levees. Sediments have formed around the leaking areas and in the adjacent Bear Creek. These heavy metal sediments are precipitated out of solution once the pH of the waste solutions are raised. This process occurs naturally as the wastes mix with surface runoff and groundwater. The probability of contaminating surface water runoff and the groundwater is almost certain in this area.

The next active area of concern involves New Hope Pond. This surface impoundment is located on the eastern most end of the facility. The East Fork of Poplar Creek paralled the area adjacent to the facility before it was constructed and was relocated as an "industrial stream" next to the south side of the plant so as to serve the plant as a disposal stream into New Hope Pond. Consequently, New Hope Pond serves as a surface impoundment for the Y-12 facility and discharges into East Fork of Poplar Creek. There is an N.P.D.E.S. permit for the impoundment. Water Quality data received from an Oak Ridge National Laboratory study confirms that considerable concentrations of mercury are present in the sediments of the pond and in various locations downstream in East Fork Poplar Creek. Mercury is an EP toxic hazardous waste, therefore the New Hope Pond is an unlined hazardous waste surface impoundment.

Another area of concern is the Y-12 Chestnut Ridge Sludge Basin located on Chestnut Ridge at the southeast side of the facility. This hazardous waste sludge basin is utilized for disposal of sediments from New Hope Pond. As indicated previously, these sediments contain considerable concentrations of mercury. This sludge basin has been utilized in the past for disposal of other hazardous materials containing P.C.B.s and depleted radioactive materials.

The Y-12 facility has four other areas listed below which presently accept hazardous wastes or have accepted hazardous wastes since November, 1980. These areas include:

A. The Y-12 Hazardous Chemical Disposal Area
B. The Y-12 Waste Oil Landfarm
C. The Y-12 Plant Walk-In Pits
D. The Y-12 Hazardous Waste Landfills

(Note: None of the areas listed above were identified as hazardous waste treatment, storage, or disposal facilities within the Y-12 facility complex. However they were identified by D.O.E. in Reports On Potential Hazardous Waste Disposal Facilities.)

The four areas described below are all located approximately 2.5 miles west on Bear Creek Road from the main entrance to the Y-12 Facility.

A. The Y-12 Hazardous Chemical Disposal Area has accepted heavy metals and known carcinogens since November, 1980. However, these hazardous wastes were removed and are currently disposed of in the Y-12 Walk-In Pits or the Y-12 Hazardous Waste Landfills. Presently , this disposal area accepts only reactive or explosive chemicals and gas cylinders.

B. The Y-12 Waste Oil Landfarm treats oils contaminated with chlorinated solvents and some depleted radioactive materials. From 1973 to 1978, oils containing P.C.B.s were treated at the landfarm. P.C.B.s are presently stored for future incineration. The chlorinated solvents are currently kept below 1% before land spreading. This area is a previous hazardous waste processing, treatment and disposal area.

C. The Y-12 Walk-In Pits were used for disposal of acids, caustics, heavy metals, certain organics and depleted radioactive materials. The identities, volumes, and concentrations of these hazardous wastes prior to 1976 is not complete; however, since October, 1981, these disposal pits are utilized for only depleted uranium.

D. The Y-12 Hazardous Waste Landfills are burial grounds utilized for the disposal of various hazardous wastes consisting of organic and inorganic liquids, cyanide bearing sludges, depleted radioactive material, etc. Since November, 1980, some organic solvents were poured out on the ground to vaporize. This poor hazardous waste management practice has since been terminated. Hazardous Wastes containing lead, mercury, and sludges bearing other heavy metals have also been disposed of in this area.

RECOMMENDATIONS/REMARKS

The Y-12 Facilities Complex has generated, treated, stored, and disposed of various hazardous wastes in conjunction with, in some instances, depleted radioactive wastes. Some of these poor treatment, storage and disposal practices have been terminated, but others still remain intact. The Y-12 facility needs to pursue very definite and positive steps in properly managing their hazardous wastes.

Mark Burris, Environmental Engineer

January 6, 1982
DATE

MB:pjm TH/2

ROUTING AND TRANSMITTAL SLIP

Date 12/20/82

TO: (Name, office symbol, room number, building, Agency/Post)	Initials	Date
1. JOHN LENARD		
2. DIV. OF SOLID/HAZARDOUS WASTE		
3. REGIONAL HEALTH OFFICE		
4. 1522 CHEROKEE TRAIL		
5. KNOXVILLE, TN 37916		

	Action		File		Note and Return
	Approval		For Clearance	☒	Per Conversation
	As Requested		For Correction		Prepare Reply
	Circulate		For Your Information		See Me
	Comment		Investigate		Signature
	Coordination		Justify		

REMARKS

THIS IS THE REGION IV POSITION ON DOE FACILITIES. HOWEVER THIS MAY OR MAY NOT BE THE AGENCY POSITION. NO DECISION HAS BEEN MADE IN HEADQUARTERS —

IF YOU HAVE ANY QUESTIONS PLEASE CALL ME

DO NOT use this form as a RECORD of approvals, concurrences, disposals, clearances, and similar actions

FROM: (Name, org. symbol, Agency/Post) BILL GALLAGHER, EPA WASTE PLANNING SECTION	Room No.—Bldg.
	Phone No. 404 881 3016

5041-102

OPTIONAL FORM 41 (Rev. 7-76)
Prescribed by GSA
FPMR (41 CFR) 101-11.206

* GPO : 1981 O - 361-529 (25)

Mi13 12-28-82

DEC 27 1982

File - Haz. waste DOE Facil. Oak Ridge

, GA

Solid & Hazardous

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M.I.S. 12-20-82 1982

File - Haz Waste Facilities
DOE
Oak Ridge

REGION IV - ATLANTA, GA

DEC - 8 1982

Proposed MOU Between EPA and DOE Concerning Solid & Hazardous Waste Management at DOE Facilities

Regional Administrator
Region IV

Paul C. Cahill, Director
Office of Federal Activities

We have reviewed the above referenced proposed MOU between EPA and DOE and we have the following concerns:

1. We believe it was the Congressional intent in Section 1004 (27) of RCRA that hazardous wastes that are not covered by the limited exemption for wastes that are "source, special nuclear, or by-product material" as defined by the AEA, are to be regulated by EPA/an authorized State. Further, the intent of Congress in Section 1004(4) and 6001 is unmistakably clear that all Federal facilities without exception are subject to "...all Federal, State, interstate, and local requirements, both substantive and procedural (including any requirement for permits or reporting or any provisions for injunctive relief and such sanctions as may be imposed by a court to enforce such relief), respecting control and abatement of solid waste or hazardous waste disposal in the same manner, and to the same extent, as any person is subject to such requirements, including the payment of reasonable service charges."

2. The proposed MOU would have limited usefulness - an agreement between EPA and DOE would have little or no meaning in an authorized State. All eight (8) states in Region IV are authorized for Phase I of the Federal hazardous waste program. We expect all 8 to receive final authorization by January 26, 1985. It is expected that the majority of the states across the country will have final authorization by January 26, 1985. This means that the Federal program is no longer in effect in those states. The State laws and regulations will be operating in lieu of the Federal program.

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3. In Section 3007(4) of RCRA, Congress clearly intended that EPA/an authorized State have access to any hazardous waste facility to ensure compliance with the EPA or the applicable authorized state laws or regulations for hazardous waste management. EPA/State access for inspections is extremely important to lend the necessary technical expertise in properly managing the waste. EPA/State access to a site will also lend credibility to any program in the public eye. ✓

4. If exception to any regulation at a facility is indicated, and the program is authorized, the Director of an authorized state program has the clear role in making these decisions. Additionaly, any exception granted must be done in accordance with established legal and administrative procedures. This may include rulemaking in compliance with the Administrative Procedures Act at both the Federal and State level.

If you have any questions, please contact Bill Gallagher of my staff at FTS 257-3016.

Original Signed By:

Charles R. Jeter

Attachment (Oak Ridge Letter)

cc: John Skinner, Office of Solid Waste U.S. EPA, Washington, D.C. (WH-563) w/attachment

Region IV State Solid Waste Directors w/attachment

bcc: Dick Payne, Radiation Program
Ann Asbell, Attorney, ORC
Art Linton, Fed. Facilities Coordinator

BG 12/6
AW-RM:B.Gallagher:PLA:3016:11-8-82 Want 40422

AW-RM ANTLEY	AW-RM PAYNE	OPM LINTON	AW-RM SCARBROUGH	RC SARGENT	AW-RM ~~DEVINE~~
12/6	12/6	[illegible]	12/6/82	12/1/82	GH 12/7

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

29 JUN 1983

OFFICE OF
GENERAL COUNSEL

Honorable Albert Gore, Jr.
Chairman, Subcommittee on Investigations
and Oversight
Committee on Science and Technology
U.S. House of Representatives
Suite 2321 Rayburn House Office Building
Washington, D.C. 20515

Dear Congressman Gore:

In response to your letter of June 22, 1983, I am enclosing two legal memoranda written by this office, addressing the applicability of state and federal hazardous waste requirements to Department of Energy facilities operated under authority of the Atomic Energy Act of 1954, 42 U.S.C. §§2011 et seq.

If your office has any questions, please call Joseph Freedman of my staff at 382-7700.

Sincerely,

Jim Barnes

A. James Barnes
Acting General Counsel

Enclosure

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

29 JUN 1983

OFFICE OF
GENERAL COUNSEL

Honorable Albert Gore, Jr.
Chairman, Subcommittee on Investigations
and Oversight
Committee on Science and Technology
U.S. House of Representatives
Suite 2321 Rayburn House Office Building
Washington, D.C. 20515

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If your office has any questions, please call Joseph Freedman of my staff at 382-7700.

Sincerely,

A. James Barnes
Acting General Counsel

Enclosure

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

22 JUN 1983

OFFICE OF
GENERAL COUNSEL

MEMORANDUM

SUBJECT: RCRA Regulation of Wastes Handled by DOE Facilities

FROM: A. James Barnes
Acting General Counsel (LE-130)

A. James Barnes

TO: Pasquale A. Alberico
Acting Director
Office of Federal Activities (A-104)

Issue Presented:

In your June 2, 1983 memorandum, you have asked whether RCRA applies to Department of Energy ("DOE") facilities.

Conclusion:

RCRA does apply to DOE facilities, including those operated under authority of the Atomic Energy Act of 1954, as amended ("AEA"), 42 U.S.C. §2011 et seq. However, specific RCRA regulations may not apply to some aspects of DOE operations, if it is determined, on a case-by-case basis, that the application of those regulations would be inconsistent with the requirements of the AEA. In addition, RCRA does not apply to "source, special nuclear or by-product materials" as defined by the AEA. 1/

1/ This memorandum will use the term "nuclear wastes" to refer to wastes consisting of "source, special nuclear or by-product material". Other types of wastes are referred to herein as "chemical wastes".

Discussion:

A. Nuclear Wastes

The only materials which EPA can regulate under RCRA are "solid wastes" and "hazardous wastes" (which are a subset of "solid wastes"). Section 1004(27) of RCRA expressly exempts from the definition of "solid waste":

> source, special nuclear or byproduct material as defined by the Atomic Energy Act of 1954, as amended.

Thus, it is clear that RCRA does not apply to nuclear wastes handled at DOE facilities.

B. Chemical Wastes

Section 6001 of RCRA expressly provides that federal facilities which manage wastes are subject both to EPA and state requirements respecting the control and abatement of solid waste or hazardous waste disposal. However, such regulation of chemical wastes at DOE facilties is limited by Section 1006 of RCRA, which provides in part that:

> [n]othing in this Act shall be construed to apply to (or to authorize any state... to regulate) any activity or substance which is subject to the...Atomic Energy Act of 1954...except to the extent that such application (or regulation) is not inconsistent with the requirements of [the AEA].

While this provision clearly precludes any EPA or state regulation that would be inconsistent with DOE responsibilities under the AEA, we cannot agree with DOE's contention 2/ that because "the AEA itself establishes a regulatory framework by which DOE...is authorized to prescribe and enforce regulations and other requirements necessary for the sound management of the AEA activities," any application of EPA's hazardous waste management regulations would be inconsistent with the requirements of the AEA (DOE Letter, p. 2).

2/ This contention was expressed in a letter (copy attached) dated November 14, 1980, from Stephen Greenleigh, Assistant General Counsel for Environment at DOE to the former Associate General Counsel for Water and Solid Waste at EPA. The letter is referred to herein as the "DOE letter".

First, DOE's analysis would render the cited language in Section 1006 a nullity. By its very presence in RCRA, that provision clearly suggests that there may be some activities and wastes subject to the AEA which EPA can regulate.

Second, the notion that national security considerations dictate a general exemption of all DOE AEA facilities is belied by Section 6001 of RCRA, which authorizes the President to:

> exempt any solid waste management facility of any department...in the executive branch from compliance with [a federal or state solid or hazardous waste] requirement if he determines it to be in the paramount interest of the United States to do so.

If the application of a federal or state standard to DOE facilities is inimical to national security, DOE may seek a Presidential "paramount interest" exemption from those standards. Absent such an exemption, the applicability or inapplicability of EPA and state solid and hazardous waste regulations must depend on their consistency (or inconsistency) with AEA requirements.

Third, the AEA provision which DOE cites as evidence of its broad regulatory authority under the AEA (Section 161(i)(3)) does not by itself compel the conclusion that the regulation of DOE facilities under RCRA would necessarily be inconsistent with that authority. 3/ Section 161(i)(3) authorizes DOE to prescribe "standards and restrictions governing the ...operation of facilities used to conduct [AEA activities] in order to protect health and to minimize danger to life and property." Even if we admit the possibility that all of EPA's hazardous waste regulations could be inconsistent with the standards and restrictions of facility operations promulgated by DOE under this provision, there is no way of determining this without a comparison of the two sets of standards. Neither EPA nor DOE has undertaken such a comparison. Indeed, in its correspondence, DOE has not identified a single RCRA regulation that is inconsistent with requirements that DOE facilities must meet under the AEA.

3/ It has already been judicially determined that the fact that RCRA may overlap with another statute does not mean that RCRA regulations are inapplicable. CMA v. EPA, 673 F.2d 507 (D.C. Cir. 1982).

In its letter, DOE also asserts that Section 161(j) of the AEA preempts any application of RCRA to chemical wastes managed at DOE facilities. Section 161(j) provides that DOE may:

> without regard to the provisions of the Federal property and Administrative Services Act of 1949...or any other law, make such disposition as it may deem desirable of (1) radioactive materials, and (2) any other property, the special dispositon of which is, in the opinion of [DOE] in the interest of the national security.

Again, this provision does not compel the conclusion reached by DOE. Section 161(j) was adopted in 1959, well before enactment of RCRA and any manifestation of Congressional concern about the problem of hazardous waste disposal. The quoted section, despite its "without regard to...any other law" provision, cannot be construed to limit the application of a law enacted seventeen years later, which pertains to an area of concern that: (1) is unrelated to Federal disposition of property 4/; (2) specifically requires all Federal facilities to meet applicable state and Federal solid waste management requirements; and (3) establishes a special procedure for exempting Federal facilities from those requirements if it is in the "paramount interest" of the United States to do so. Thus, in our opinion, Section 161(j) cannot be construed to confer on DOE facilities a blanket exemption from RCRA requirements. 5/

4/ It is doubtful that the term "property" in Section 161(j) even encompasses wastes. The citation in Section 161(j) to the Federal Property and Administrative Services Act of 1949, the title of Section 161(j) ("surplus materials") as well as references to the purchasing and leasing of property in other paragraphs of Section 167 all suggest that the term has a very traditional meaning and does not include sludges, garbage, tars, trash and other wastes.

5/ Although we believe that §161(j) was not intended to abridge subsequently enacted statutes pertaining to different subject matter, it is an elementary principle of statutory construction that inconsistent provisions must be resolved in favor of the later enacted statute. See, *e.g.*, *Georgia v. Pennsylvania R. Co.*, 324 U.S. 439, 456-57 (1945); *International Telephone & Telegraph Co. v. General Telephone and Electronics Corp.*, 518 F.2d 913, 935 (9th Cir. 1975).

In short, we cannot conclude that DOE activities under the AEA, simply by their virtue of being AEA activities, are exempt from RCRA requirements. However, we do not reject the possibility that some RCRA regulations might be inconsistent with AEA requirements and therefore inapplicable to DOE facilities. Such inconsistency can only be determined on a case-by-case basis. EPA and DOE should be able to identify inconsistent regulations by a cooperative effort.

C. Mixtures of Chemical Wastes and Nuclear Wastes

EPA's authority to regulate chemical wastes at DOE facilities may be limited to the extent that such wastes are mixed with nuclear wastes. An argument can be made that any regulation of mixtures of chemical and nuclear waste would amount to *de facto* regulation of nuclear wastes, and is thus precluded under Section 1004(27). It may also be argued that the addition of small quantities of nuclear waste to solid waste does not remove such solid wastes from RCRA jurisdiction.

Further information as to the precise nature of such mixtures is necessary in order to reach a definite legal position on this issue, which goes far beyond the question of whether DOE facilities are subject to RCRA regulatory requirements. 6/ We would need to consult further with DOE on this matter and to analyze additional data before making a final decision.

Attachment

cc: Lee Thomas
Regional Counsel, Regions I-X

6/ Our interpretation would affect our ability to regulate private facilities handling mixtures of nuclear and chemical wastes and our ability to bring imminent hazard actions under Section 7003 of RCRA.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

August 6, 1981

OFFICE OF
LEGAL COUNSEL AND ENFORCEMENT

MEMORANDUM

SUBJECT RCRA Regulation of Wastes Handled by DOE Facilities

FROM: Frank A. Shepherd
Associate Administrator for
Legal Counsel and Enforcement (A-130)

TO: Anne M. Gorsuch
Administrator (A-100)

Background:

Under the Atomic Energy Act of 1954, as amended ("AEA"), 42 U.S.C. §2011 et seq., the Department of Energy ("DOE") conducts research and development activities pertaining to nuclear material and produces nuclear materials and weapons in its own production facilities. In the course of these activities, DOE facilities generate wastes containing source, special nuclear or byproduct material ("nuclear wastes") as well as other types of wastes ("chemical wastes"). 1/ Many of these wastes are handled on-site.

DOE has taken the position in two letters to us 2/ that the AEA and Section 1006 of the Resource Conservation and Recovery Act of 1976, as amended ("RCRA"), 42 U.S.C. §6906, preclude EPA and state regulation of nuclear wastes, chemical wastes and mixtures of chemical and nuclear wastes handled by DOE facilities. You have asked whether EPA is required to regulate hazardous wastes at DOE facilities.

Conclusions:

We agree that neither EPA nor the states have authority under RCRA to regulate the management of nuclear wastes which may be handled by DOE facilities.

1/ This memorandum will use the term "chemical wastes" to refer to all wastes (including radioactive wastes) which are not defined as "source, special nuclear or by-product material" under the AEA.

2/ Letter to Stephen H. Greenleigh, Assistant General Counsel for Environment, DOE, to James A. Rogers, Associate General Counsel, Water and Solid Waste Division, EPA, dated July 30, 1980; Letter from Mr. Greenleigh to Mr. Rogers dated November 14, 1980 (hereinafter "DOE Letter".) A copy of the November 14 letter is attached (Tab A).

ATTACHMENT B

It is our opinion that EPA and state regulation of chemical wastes is authorized, but only to the extent that such regulation is not inconsistent with the requirements of the AEA. Moreover, even in those situations where EPA regulation of chemical wastes managed at DOE facilties would be consistent with the AEA, EPA may refrain from exercising its regulatory authority if DOE regulations or policies regarding hazardous waste management provide protection comparable to EPA hazardous waste regulations. In addition, under RCRA Section 6001, the President may issue an order exempting DOE facilities from any Federal or state solid or hazardous waste regulation if he determines it to be in the "paramount interest" of the United States to do so.

Finally, our authority to regulate chemical wastes at DOE facilities may be limited to the extent that such wastes are mixed with nuclear wastes. While further information as to the precise nature of such mixtures is necessary in order to reach a definite conclusion on this issue, our preliminary thinking is that we are generally precluded from regulating chemical and nuclear waste mixtures under RCRA. However, there may be some types of mixtures over which RCRA jurisdiction will lie.

Recommendations:

We recommend that the attached letter (Tab B) be sent to the Secretary of Energy. The letter sets forth our legal conclusion concerning the applicability of RCRA to wastes generated by DOE facilities and suggests three methods by which the primary regulatory authority over chemical wastes may be exercised by DOE.

Discussion:

A. Nuclear Wastes

The only materials which EPA can regulate under RCRA are "solid wastes" and "hazardous wastes" (which are a subset of "solid wastes"). Section 1004(27) of RCRA expressly exempts from the definition of "solid waste":

> source, special nuclear or byproduct material as defined by the Atomic Energy Act of 1954, as amended.

Thus, we think it clear that RCRA does not apply to nuclear wastes handled at DOE facilities. For the same reasons, states have no authority under RCRA to regulate nuclear wastes handled at DOE facilities.

B. Chemical Wastes

1. EPA

Section 6001 of RCRA provides that federal facilities which manage hazardous wastes are subject to EPA regulation under RCRA. However, EPA regulation of chemical wastes at DOE facilities is limited by Section 1006 of RCRA, which provides in part that:

> [n]othing in this Act shall be construed to apply to (or to authorize any State... to regulate) any activity or substance which is subject to the...Atomic Energy Act of 1954...except to the extent that such application (or regulation) is not inconsistent with the requirements or such [Act].

We believe that this provision clearly precludes any EPA regulation which is inconsistent with DOE responsibilities under the AEA. Further, to the extent that DOE regulations and policies provide a degree of environmental protection comparable to EPA's regulations, the Agency may wish to refrain from exercising its authority at DOE facilities. 4/ We cannot agree, however, with DOE's contention that because "the AEA itself establishes a regulatory framework by which DOE...is authorized to prescribe and enforce regulations and other requirements necessary for the sound management of the AEA activities", any application of EPA's hazardous waste management regulations would be inconsistent with the requirements of the AEA (DOE Letter, p. 2).

First, DOE's analysis would render the cited language in Section 1006 a nullity. By its very presence in RCRA, that provision clearly suggests that there may be some activities and wastes subject to the AEA which EPA can regulate.

Second, the AEA provision which DOE cites as evidence of its broad regulatory authority under the AEA (Section 161(i)(3)) does not by itself compel the conclusion that the regulation of DOE facilities under RCRA would necessarily be inconsistent with that authority. Section 161(i)(3) authorizes DOE to prescribe "standards and restrictions governing the ... operation of facilities used to conduct [AEA activities] in order to protect health and to minimize danger to life and property." Although it is possible that all of EPA's hazardous waste regulations might be inconsistent with the standards and restrictions of facility operations promulgated by DOE under this provision, there is no way of determining this without a case-by-case comparison of the two sets of standards.

In its letter, DOE also asserts that Section 161(j) of the AEA preempts any application of RCRA to chemical wastes managed at DOE facilities. Section 161(j) provides that DOE may:

4/ We do not have any information on the extent to which DOE regulates the management of hazardous waste at its facilities. If the Administrator finds that DOE regulations provide environmental protection comparable to that provided by EPA's RCRA regulations, the Agency could take the regulatory action of issuing a permit by rule for hazardous waste treatment, storage and disposal operations at DOE facilities. In addition or as an alternative, the Administrator could issue an internal order that no enforcement action or inspections be undertaken with respect to DOE facilities.

> without regard to the provisions of the Federal property and Administrative Services Act of 1949...or any other law, make such disposition as it may deem desirable of (1) radioactive materials, and (2) any other property, the special disposition of which is, in the opinion of [DOE] in the interest of the national security.

Again, this provision does not compel the conclusion reached by DOE. Section 161(j) was adopted in 1959, well before enactment of RCRA or any manifestation of Congressional concern about the problem of hazardous waste disposal. The quoted section, despite its "without regard to ... any other law" provision, cannot be construed to limit the application of a law enacted seventeen years later, which pertains to an area of concern unrelated to Federal disposition of property, 5/ and which specifically requires all Federal facilities to meet applicable state and Federal solid waste management requirements and establishes a special procedure for exempting them from those requirements. 6/ Thus, in our opinion, Section 161(j) cannot be construed to provide DOE facilities a blanket exemption from RCRA requirements.7/

In short, we cannot conclude that DOE activities under AEA, simply by their virtue of being AEA activities, are exempt from RCRA requirements. However, we do agree that if RCRA regulations are found to be inconsistent with AEA requirements they cannot be applied to DOE facilities. EPA and DOE should be able to identify inconsistent regulations by a cooperative effort. In addition, EPA can refrain from regulating DOE facilities under RCRA if the Agency concludes that DOE regulations or policies provide environmental protection comparable to EPA's RCRA regulations.

5/ It is dubious that the term "property" in Section 161(j) even encompasses wastes. The citation in Section 161(j) to the Federal Property and Administrative Services Act of 1949, the title of Section 161(j) ("surplus materials") as well as references to the purchasing and leasing of property in other paragraphs of Section 167, all suggest that the term has a very traditional meaning and does not include sludges, garbage, tars, trash and other wastes.

6/ The President may by Executive Order exempt any solid waste management facility owned or operated by a Federal agency from compliance with any Federal or state solid waste regulation if "he determines it to be in the paramount interest of the United States."

7/ Although we believe that §161(j) was not intended to abridge subsequently enacted statutes pertaining to different subject matter, it is an elementary principle of statutory construction that inconsistent provisions must be resolved in favor of later-enacted statute. See, e.g., Georgia v. Pennsylvania R. Co., 324 U.S. 439, 456-57 (1945); International Telephone & Telegraph Co. v. General Telephone & Electronics Corp., 518 F.2d 913, 935 (9th Cir. 1975).

2. States

We believe that state hazardous waste regulatory authority is at least equal to that of EPA. Section 6001 expressly requires Federal facilities to comply with state standards, and states are permitted by Section 3009 of RCRA to impose more stringent requirements than EPA. If the application of a state standard to DOE facilities is inimical to national security, Section 6001 provides DOE an opportunity to seek a "paramount interest" exemption from those standards.

To the extent that state hazardous waste regulation of DOE facilities is possible only by virtue of Section 6001, such regulation is impermissible if inconsistent with AEA requirements. 9/ This memorandum does not address the authority which states may have, independent of RCRA, to regulate chemical wastes at DOE facilities.

C. Mixtures of Chemical Wastes and Nuclear Wastes

A good argument can be made that any regulation of mixtures of chemical and nuclear wastes would amount to de facto regulation of nuclear wastes, and is thus precluded under Section 1004(27).

Further information as to the precise nature of such mixtures is necessary in order to reach a definite legal position on this issue, which goes far beyond the question of whether DOE facilities are subject to RCRA requirements. 10/ Our preliminary thinking is that while we probably do not generally have jurisdiction over mixtures of chemical and nuclear wastes, there may be some mixtures over which RCRA jurisdiction will lie. (For example, it may be desirable to regulate chemical wastes tainted by minute amounts of nuclear wastes or to prohibit the mixing of chemical and nuclear wastes).

In any event, the dearth of information available to EPA about waste streams at DOE facilities makes it difficult to assess the applicabiity of RCRA to chemical/nuclear waste mixtures handled by those facilities. We would need to consult with DOE further before making a final decision on this issue.

Attachment

9/ This issue would best be resolved between DOE and individual states.

10/ Our interpretation would affect our ability to regulate private facilities handling mixtures of nuclear and chemical wastes and our ability to bring imminent hazard actions under Section 7003 of RCRA.

CHRONOLOGIES OF EVENTS

Chronologies of certain events were prepared by the staff of the Investigations and Oversight Subcommittee as a result of their investigation for use of the Subcommittees' Members at the hearing. At the request of the Subcommittee Chairpersons, the following chronologies are included in the record:

1. Chronology of DOE's discovery and response to the mercury problem (Elwood Report, Inventory Report, TVA, 1982 Van Winkle Report, 1982-EIS).
2. Chronology of controversy over Steven Gough and "unauthorized" sampling.
3. Chronology of the NPDES permit negotiations.
4. Chronology of the claimed DOE exemption from RCRA and CERCLA.

July 6, 1983

MEMORANDUM

TO: Albert Gore, Jr., Chairman
Subcommittee on Investigations and Oversight

FROM: Robert B. Nicholas, Chief Counsel/Staff Director
Adam Finkel
Kurt Karsten

SUBJ: Oak Ridge Hearing

Overview: The primary purposes of the hearing are (1) to assess the impact -- immediate and long-term -- of the mercury discharged from the Y-12 plant on the Oak Ridge environment, and (2) to ensure that appropriate data gathering and remedial efforts are undertaken. Issues concerning other sources of pollution and the waste disposal practices at the other facilities on the Oak Ridge Reservation (e.g. Oak Ridge National Laboratory and the Gaseous Diffusion Plant) and the impact of pollutants other than mercury (e.g. PCBs, radioactive waste, acidic wastes) will be raised by the witnesses as well.

Issues: There are three primary issues. The first is central to the hearing; the others will surely come up.

1. State of the Environment at Oak Ridge. 2.4 million pounds of mercury are presumed to be lost to the environment at Oak Ridge, during 1950-1968, as a result of a lithium separation process used at the Y-12 plant. Where is the mercury now? What form is it in? What if any health or environmental threat -- short-term or long-term -- does the mercury pose? Is there enough data to make a reasoned assessment of these questions? What is the quality of the data? To the extent there are data gaps, are there appropriate plans to gather the necessary data? Are there sufficient plans for peer review of protocols, methodologies and results to provide credibility to the data efforts?

2. Attention to Problems. DOE was clearly aware of the extent of the mercury loss at least as early as 1976. There has been substantial speculation in the press and elsewhere that DOE did not follow up on its knowledge and covered up the magnitude of the loss and potential environmental problem. While some may be interested in pointing the finger at DOE, the issue of current concern is whether DOE is now on the right track and what can be done to ensure that DOE appropriately responds to environmental problems in the future.

3. Jurisdiction. The mercury issue has served to highlight problems with DOE's water discharge permits (NPDES) and with its waste disposal practices generally. Apart from the issues raised by the environmental consequences of DOE activities, a number of parties have raised questions about EPA's lax permitting and enforcement policies for federal facilities under the Clean Water Act (CWA). Additional concerns have been raised about

the absence of clear lines of authority between DOE, EPA and the State over federal facilities under the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA or Superfund), and CWA, particularly regarding radioactive waste. DOE asserts a broad exemption from EPA and State jurisdiction over much of Oak Ridge under its interpretation of RCRA, CERCLA and, to a lesser extent, the CWA.

CHRONOLOGY OF DOE'S DISCOVERY AND RESPONSE TO THE MERCURY PROBLEM

(Elwood Report, Inventory Report, TVA,
1982 Van Winkle Report, 1982-EIS).

OVERVIEW

Scattered samples indicating high concentrations of mercury in the sediments and fish of the EFPC were documented by DOE well before 1976. However, as part of preliminary sampling for environmental impact statements for the three DOE facilities, a general report on mercury contamination in the Poplar Creek and Clinch River was presented in December 1976 in a meeting between key DOE and UCND officials. By August 1977, DOE officials had communicated to TVA that some elevated levels of mercury had been documented which deserved further monitoring. A dialogue over further monitoring ensued without resolution as to the EFPC, in part or primarily because TVA had not been provided complete data. In August 1978, DOE gave Tennessee State officials a copy of the same data given to TVA officials in 1977. Apparently, no data was asked for by or given to EPA. It was not until late 1982 that the State of Tennessee and EPA Region IV became aware of the extent and degree of the mercury contamination of the EFPC sediments and fish, at which point the State officially closed the stream to fishing. The March 1983 public release (as a result of Slavin's FOIA request) of an unclassified version of the 1977 report on the mercury inventory losses at Y-12 during 1955-1977, focused extensive media attention on the mercury contamination of EFPC for the first time. The essential question presented is whether DOE was aggressive in discovering the loss of mercury at Y-12 and whether it aggressively set out to learn the extent of the problem and develop a solution to it.

In chronological order, knowledge of the degree and extent of the mercury contamination was as follows:

THE ELWOOD REPORT:

Early 1976	The Elwood Report is commissioned. A planning meeting on preliminary studies for proposed Environmental Impact Statements for all three DOE facilities was held with the three environmental coordinators, several ORNL staffers, and Jerry Wing of DOE in attendance. Mike Mitchell, coordinator for the K-25 plant requested that a study on mercury contamination in the Clinch River, Poplar Creek and EFPC be done since high concentration of mercury had been noted in sediment surrounding the K-25 plant. According to Jerry Elwood, that verbal request was agreed to; however, the scope of the study was restricted to omit the EFPC. Elwood doesn't recall who restricted the scope of the study. However, he stated that funding for that study came from DOE and therefore DOE had final say as to the scope of the study.
Dec. 20, 1976	The Elwood Report. Jerry Elwood presented a report on mercury contamination of fish and sediments of the Poplar Creek and Clinch River drainage, at a meeting attended by Richmond (ORNL), Wing (DOE) and the environmental

coordinators from the three facilities. The report documented that concentrations of total mercury in the muscle of all largemouth bass collected in Poplar Creek in 1976 exceeded the FDA action level for mercury in fish of 0.5 ppm, and that 95% of the total mercury in these fish was in the methyl form. Recommendations were made for further monitoring to identify the source of the contamination and the rate of transport downstream. The written report was delivered to Richmond (ORNL) on March 22, 1977, classified as "business confidential" by ORNL and DOE (apparently at DOE's request) and circulated for comment.

Feb. 9, 1977 Wing advises that bringing in TVA "may be awkward". In his weekly report to the OR manager, Wing (DOE) states that he discouraged DOE Headquarters from requiring an EIS from the Oak Ridge facilities because of "the probable need to drag TVA into the ORGDP EIS" and "the awkward situation of having to discuss mercury in fish at ORGDP when the mercury may have come from Y-12." To forestall DOE-HQ from telling DOE-ORO to reclassify the present EA as an EIS, Wing advised ORO-HQ that "that EA was not even near EIS quality and that it would require $2.5 million and 2 years to do it right." Previous correspondence between UCND-ORNL and DOE-ORO placed the figure of upgrading the EIS at substantially less.

Apr. 22, 1977 Wing's comments on the Elwood report. Wing (DOE) responded to the Elwood report with comments aimed at "putting the contamination problem in perspective". He pointed out that no formal FDA action level for mercury in fish has yet been adopted. He further discussed the "unrealistic" logic which underlay the proposed action level. He suggested that the "removal" of two data points of 300 ppm sediment concentration may decrease the "variability" of the report's data. Finally, he suggested including data from several non-local lakes which are equally or more contaminated, for perspective since "there was no plan (to our knowledge) to restrict fishing or alert the public using those lakes." Wing also suggested further studies with "more suitable" analytical techniques, and concluded that "I do not believe it is sufficiently understood at this time to warrant release of this information."

TVA is Notified:

May 4, 1977 Transmittal of Data to TVA. A summary of the Elwood report, (consistent with the previously described ORO comments) indicating significant mercury contamination of the fish and sediment of the Poplar Creek and Clinch River areas was given to TVA officials. However, expressed as averages, in the summary form, the data did not clearly indicate the severity of contamination in places, nor indicate the EFPC and Y-12 as the likely source of contamination. Instead, geographically, the report focused on the ORGDP and ORNL locations. According to Wing's report, TVA was "interested, but not alarmed." Joint monitoring was discussed. Wing expressed his preference for TVA monitoring as "this would be a much better approach than the publication of a set of

	limited data ... This type of information could reach the local public in an aberrant perspective and cause undue concern over non-existent health hazards or relatively insignificant environmental matters." (Emphasis added.)
June 9, 1977	The Mercury Inventory Report at Y-12. A full inventory of mercury losses and spills (1955-1977) was prepared in response to a request by the plant manager at Y-12 in preparation for the impending Environmental Assessment of the Y-12 facility, and for bookkeeping purposes. The inventory showed 2.4 million pounds of mercury either lost on unaccounted for, with approximately 500,000 pounds discharged directly to the EFPC. The report was marked classified, with distribution limited to the DOE assistant directors for the three plants, the plant managers, and their environmental coordinators. (A non-classified internal UCND memo reports the loss of a substantial quantity of mercury.) Apparently, Richmond at ORNL did not receive a copy of the inventory until its 1983 release. Since Richmond was not in his current supervisory position in 1977, the fact that he may not have seen the report is not surprising. Auerbach also denies seeing the report in 1977. It is unclear who else saw or was aware of the report in 1977, though at some point the paths of the Elwood and Inventory Report crossed. Those who had knowledge of both reports clearly had a picture of the potential severity and extent of the problem. These people include the plant coordinators, Jerry Wing, DOE plant managers, OR manager, and certain assistant managers (e.g. Hickman.)
July 8, 1977	DOE transmits further Data to TVA. In response to requests from Jack Milligan (TVA) on mercury contamination, Jake Alexander (DOE) sent TVA sections of several reports including parts of the written Elwood Report. The sections transmitted included data showing the 300 ppm sediment concentrations near the mouth of EFPC, and identified New Hope pond as a possible source of recent mercury discharge, although the bulk of the data was on Poplar Creek and Clinch River. "Speculative" or "irrelevant" portions of the reports were deleted,
Aug. 2, 1977	TVA Response. Ralph Brooks (TVA) wrote to R.J. Hart (DOE) to confirm an agreement to design and implement a sampling survey on mercury contamination in the Melton Hill Reservoir/Clinch River area, in the vicinity of ORNL. The EFPC area was not included in the scope of that planned survey. It is unclear why this happened.
Feb. 13, 1978	DOE convinces TVA to focus on the ORGDP area. Jake Alexander (DOE) provided TVA with more of the 1977 Elwood sampling data for fish and sediments and told TVA that the area of interest was not ORNL, but rather was ORGDP.
March 27, 1978	TVA declines to monitor further. Brooks (TVA) wrote to Hart (DOE) that "based on the rather extensive data base DOE had

provided," all of which came from the 1977 Elwood report or 1974 Reece report, TVA saw no need for immediate sampling. TVA suggested they reappraise the need for further sampling in January 1979.

Aug. 2, 1978 DOE notifies Tennessee (TDHE) of mercury contamination. Wing reported in his weekly briefing to the OR Manager, the transmittal of the Elwood report summary, and the 1974 Reece report, to Earl Leming (TDHE). Wing reported that "Leming concluded, like TVA, that the situation was not considered serious and certainly represented no threat to the public health and safety."

Aug. 2, 1978 - May 1982. No further monitoring or sampling is done. No monitoring or sampling was done of fish and sediments during this period with specific regard to the potential mercury contamination in the EFPC. Yearly Environmental Assessments (EA) were done which included general water sampling for mercury as one of a range of heavy metals.

(NOTE: Data Gap Apart from the above mentioned published EA, we have not seen any internal documents which discuss the mercury problem during this period. The public documents contain scant reference to mercury.)

Dec. 1981 Gough takes "unauthorized" samples at EFPC. Samples reveal exceedingly high levels of mercury.

April-May 1982 The Van Winkle Report: EFPC Mercury Contamination. Officially, in preparation for the 1982 Environmental Assessment of the Y-12 facility, J. M. Case, plant manager of Y-12, commissioned ORNL to do an extensive one-month survey of mercury contamination in the EFPC near the Y-12 plant, to determine if mercury was still being released from the Y-12 plant. (Informally, the survey may have in part been in response to Gough's activities.) The report, finalized in September 1982, and noted for "limited distribution", concluded that there was a currently active source for mercury in the EFPC and New Hope Pond. The report found that 87% of the bluegill in the upstream area exceeded the new FDA action level of 1.0ug/g and that mercury concentrations at all stations exceeded background by a factor of 60 or more. The report also found that foliage and sediments in the upstream area were highly contaminated and recommended that sampling be done to determine the rate of downstream transport and the level of contamination in the cows that graze in the area.

June 1982 Gough leaves ORNL.

Oct. 26, 1982 Wing tells TDHE: "No danger since the fish are not eaten by people." In a letter to McKinney (TDHE), Jerry Wing stated that selected samples taken from the draft of the Van Winkle report, when analyzed "in context" warranted "no concern that health risks are being created in the population of Oak Ridge." Wing analyzed the samples in the context of "no

	significant fishing in the EFPC area" and of the unnecessarily stringent FDA action levels.
Oct. 27, 1982	UCND tells ORO draft EIA inaccurate. Gordon Fee, plant manager at Y-12, writes to H. D. Hickman (ORO) and others to provide comments on the recommendation in Van Winkle report. He also notes that the draft Y-12 EIA (1982) is not accurate and at variance with the mercury data in the Van Winkle report. The inaccurate EIA is issued, unchanged in December 1982.
Nov. 1982	TDHE closes the EFPC to fishing. In response to Wing's letter notifying the state of extensive mercury contamination of EFPC, David McKinney (TDHE) ordered the EFPC posted as being closed to the possession of fish. Closure of the stream to fishing was recommended in the draft Van Winkle report, however in his letter to the state, de-emphasizing the contents of the Van Winkle report, Wing did not include that recommendation.
Dec. 15-16, 1982	The EP Toxicity sampling. Marciante (DOE) and staffers at ORNL and Y-12 sampled the EFPC near the Oak Ridge community and analyzed the sediment and core samplings as to "toxicity." The results of the quick survey indicated no significant "leaching" of methyl mercury to the EFPC.
Jan. 27, 1983	DOE discounts the threat posed by the mercury contamination. In a letter to McKinney (TDHE) Wing discounted the validity of the Van Winkle report, and emphasized the toxicity values from the December report. Wing concluded that since "EFPC is not used as a source of potable water, while a few cattle and horses may drink from the stream, it is unlikely that this poses a realistic threat either to the livestock or to man."
March 8, 1983	EPA is notified by the state of the extent of the mercury contamination. McKinney (TDHE) transmits the Gibson property data showing contamination of the sediments of the EFPC in excess of 480 ppm; McKinney points out that such contamination is previously undocumented.
May 17, 1983	DOE releases the unclassified mercury inventory report. Public release of the inventory report by DOE occurred shortly after its declassification in response to a request by Slavin and TDHE officials. The report was distributed to EPA, TDHE and members of the Oak Ridge community, accompanied by assurances that based on extensive sampling, no hazard to residents existed.
May 23, 1983	Presentation by DOE before the Oak Ridge City Council.
June 16, 1983	DOE sends EPA data showing elevated mercury levels near White Oak Creek. Wing sent to Zeller (EPA) data showing slightly elevated levels of mercury concentration in the sediment and soil near White Oak Creek which handles discharges from ORNL.

CHRONOLOGY OF CONTROVERSY OVER STEVEN GOUGH AND "UNAUTHORIZED" SAMPLING

Steven Gough worked as a research biologist at ORNL for six years, until his departure in June 1982. On December 5, 1981, Gough and his brother, Larry, a geochemist with the U. S. Geological Survey in Denver, took samples of mosses, liverworts and sycamore tree rootlets on EFPC and Bear Creek, all on DOE property. As discussed above, the samples (analyzed at USGS) revealed a "very unusual" degree of mercury contamination, even when reanalyzed. Gough later told DOE that he and his brother spontaneously decided to take the samples because of their professional interest in the uptake and fate of trace metals, and their desire to justify a research proposal for further ecological investigations in the area. Gough had worked on environmental impact statements for the K-25 area, and was familiar with the general program of mercury contamination in the area. Gough claims that between December 1981 and June 1982, he was stripped of most of his responsiblities, denied consideration for an impending promotion, and subjected to unpleasant criticism that eventually caused him to leave ORNL. The following chronology, prepared from memoranda and written recollections of meetings between Gough and his superiors, summarizes the actions and opinions of DOE employees after learning of the spontaneous sampling.

March 27, 1982	Gough writes to Webster Van Winkle (head of ORNL's Aquatic Ecology Section and Gough's immediate supervisor) about his decision to request an official USGS report on his brother's analyses. Gough notes repeatedly that previous public documents had already discussed mercury contamination in the Poplar Creek area, and suggests it would be "prudent...to alert selected responsible individuals outside the Division" about the possible mercury pathway from fish to man.
April 13, 1982	Van Winkle, in a meeting with Gough, agrees that the area would be an invaluable study system to increase knowledge about contaminant transport, but (according to Gough) says there is no way to get the idea past Jerry Wing and the other ORO officials. Van Winkle states that Y-12 monitoring has been "poor and superficial" to date. Gough mentions that Stan Auerbach called his brother's supervisor two days previously, asking that the original field notes be returned to Auerbach, that all paperwork related to the samples be destroyed, and that no written communications pass between USGS and DOE in this matter.
April 14, 1982	Larry Gough turns over data and notes to Auerbach, but USGS makes clear they will not perjure themselves if subjected to an FOIA request. Gough refers in a memo to Van Winkle to a "freeze on data collection" that Auerbach imposed.

April 21, 1982	Jerry Elwood warns Gough that Wing *et al* will "stonewall" any positive action, and expresses his frustration that Auerbach ignored his attempts to improve the monitoring program. Elwood tells Gough that DOE does not indicate on its NPDES reports many of the hazardous constituents of its effluents, and that Wing hires summer students to collect samples for in-house analyses, "as if to check up on Union Carbide" to make sure no public relations problems were impending.
April 28, 1982	Gough meets with Auerbach and Van Winkle. Auerbach tells Gough he should have "worked through the system, regardless of the perceived low probability of obtaining authorization to collect samples," and said his "message" was that DOE employees cannot "appoint [themselves] as environmental policemen." He refers to an unproven health problem, but the known sociological and "potential economic problems" for Oak Ridge. The two referred to Gough's actions as a "misdemeanor" rather than a "felony."
May 19, 1983	Auerbach explains to the *Knoxville News-Sentinel* that the secrecy surrounding the mercury analyses of biota would not have been necessary had the samples been taken from White Oak Creek (which flows through the K-25 area), but was necessary because the samples were associated with Y-12, a weapons plant whose activities are classified.

CHRONOLOGY OF THE NPDES PERMIT NEGOTIATIONS

Broader in scope than the mercury problem is the problem of the expired NPDES permits. Apart from the fact that renewal of the permits represents a broad environmental problem for DOE, renegotiation of permits has coincided with State pressure on DOE rgarding the mercury problem.

Allowed by EPA to lapse in 1980, the permits have been recently vigorously pursued by the State. Recently, Tennessee sought to enforce directly the State environmental laws against DOE. The mounting State pressure, fueled by publicity over the mercury controversy, lead to the negotiation of a Memorandum of Understanding between DOE, the State, and EPA, which provides a framework for renewal of the NPDES permits. The essential question here is, does the MOU now agreed upon effectively address the broader environmental problems at Y-12?

The chronology of the NPDES permit negotiations is as follows:

Feb. 15, 1980	The NPDES permits for Y-12 expired. Joint TDHE and EPA compliance inspections which are the basis for the renewal of the permits, were conducted in October/November of 1979. The inspections revealed several compliance problems due primarily to the 1977 amendments changing the guidelines.
Jan. 14, 1981	EPA sends TDHE the NPDES permit renewal applications from DOE. Zeller (EPA) sent Lunn (TDHE) the draft copies of the proposed NPDES permits. The renewals are essentially unchanged from the 1977 and 1973 NPDES permits, which were negotiated before the 1977 Amendments to the Clean Water Act effluent limitation guidelines for "toxic" and "nonconventional" pollutants. Zeller pointed out that as provided in the 1977 amendments, Tennessee has the option of certifying or waiving certification of the permits. Denial of certification of the permits by the State would require EPA to deny DOE's application for the NPDES permits.
June 8, 1981	TDHE again cites DOE for noncompliance. Based on a second compliance inspection, Frye (TDHE) told Wing (DOE) that the Y-12 facility was not in compliance with the new NPDES permitting program due to improper sampling techniques and inadequate monitoring locations.
Fall, 1981	Tennessee denies certification; EPA drops negotiations. Based on DOE's unwillingness to revise its NPDES permit applications to address State criticisms and regulatory changes, TDHE decided to deny certification of the proposed permits. EPA's response, consistent with the then EPA Administrator's federal facilities policy, was to not pursue renewal any further. DOE was allowed to operate under expired NPDES permits.

Nov. 10-12, 1982	TDHE and EPA again inspect for compliance. In response to pressure from TDHE, EPA agreed to conduct another compliance inspection and to set the permit renewal process in motion. In his compliance report, Sulkin (TDHE) noted the seepage problems from the S-3 ponds, the oil disposal ponds, and the industrial drainage ditch. According to Sulkin (TDHE), DOE required a two week notice for the inspection, and then limited the tour to specific sites. The inspection was terminated by DOE when Sulkin pointed out that canisters of PCB-contamined oil, stacked next to the industrial drainage ditch were apparently leaking.
Feb. 23, 1983	TDHE inspects Y-12 for compliance with State environmental laws. Sulkin (TDHE), in an effort to assert direct State jurisdiction over DOE's Y-12 facility, inspected Y-12 for compliance with State environmenal laws. In March 1983 Sulkin issued a report evaluating DOE's Y-12 facilities' noncompliance with the State of Tennessee's Water Quality Control Act, and documenting existing violations and pollution problems. Included were the New Hope Pond Sludge Disposal area, the S-3 Ponds, the Burial Ground Oil Pond, the Disposal Pits, and other noncomplying sites.
April 15, 1983	DOE responds to the State Notice of Noncompliance. Wing, in a letter to McKinney (TDHE), responded on a point by point basis to the comprehensive March 1983 Notice of Noncompliance. The response consisted of specific responses to points of noncompliance, along with proposals for studies and projects with the goals of eventual renegotiation of NPDES permits. At one point, Wing also asserted that the Y-12 facility was completely exempt from State regulation.
May 26, 1983	The Memorandum of Understanding. DOE, EPA, and TDHE agree to a framework including deadlines, for achieving renegotiation of end compliance with new NPDES permits for the Y-12 facility. The MOU is "a work plan for obtaining information, from which it is anticipated, further plans, actions and remedial programs will be developed ... Furthermore, no party... in any way waives its rights to any action available to it by law."
May 31, 1983	First deadline included in the MOU. DOE met the first deadline which required submission of a map of all discharges to EFPC, a characterization of all discharges, and interim treatment plans for the discharge.
July 1, 1983	Second deadline included in the MOU. The second deadline which required a characterization of sediments in New Hope Pond, an assessment of active sources of mercury, and plans for a New Hope Pond bypass and interim treatment. Also required was a plan to eliminate discharges to the S-3 ponds. The third deadline is July 15, 1983.

CHRONOLOGY OF THE CLAIMED DOE EXEMPTION FROM RCRA AND CERCLA

Two jurisdictional questions have been raised in discussion with the witnesses:

- To what extent are DOE's activities regulated under the Atomic Energy Act and, therefore, exempt from EPA regulation under CWA, RCRA, or CERCLA?
- To the extent DOE is not exempt, to what degree is it legal and appropriate for EPA to tailor RCRA and CWA permit standards to fit DOE's priorities or to fail to vigorously pursue compliance at federal facilities, such as Oak Ridge?

OVERVIEW:

The CWA, RCRA and CERCLA all, by explicit language, apply to federal facilities. However, the CWA, RCRA and CERCLA contain language generally precluding EPA jurisdiction over discharge or disposal of "source, special nuclear and byproduct materials" regulated under the Atomic Energy Act. Jurisdiction of such activities resides in the NRC or DOE. Generally, this has meant that EPA has jurisdiction over all nonradioactive water discharges and waste practices at the facilities unless those responsibilities have been assumed by the state. Since some discharges and waste streams have mixed radioactive and nonradioactive materials, confusion has existed over who has the appropriate responsibilities in such circumstance. In late 1980, as the regulatory framework of RCRA began to take shape, DOE began to assert a broad exemption to EPA's jurisdiction under RCRA, claiming exemption for DOE facilities -- not merely materials -- which are operated and regulated by DOE under authority of the Atomic Energy Act. The origin of this position is unclear, though it was vigorously articulated by DOE only after the November 1980 election. The exemption was strongly supported by ORO. Doe officially continues to maintain this posture and is greatly concerned about the cost of complying with EPA's regulations and "outside" oversight of its activities. The State of Tennessee claims jurisdiction over all discharges, including radioactive pollutants.

Even where the jurisdictional lines are clear, and EPA has written permits, such as under the CWA, EPA has been criticized by some for writing inadequate permits and for failing to seek compliance with its regulations at federal facilities such as Oak Ridge. This is particularly relevant to the hearing since some of the witnesses, including the State, believe that DOE's original NPDES permits were poorly written, poorly enforced and were allowed to expire without a vigorous effort to rewrite new stricter permits. While it does appear that the NPDES permits were poorly written and enforced, it is difficult to ascribe significance to the failure to rewrite the permit as EPA has a major backlog in its permit rewriting efforts.

On the hazardous waste side, EPA has been subject to criticism for failure to include federal facilities on the Superfund priority list. While

Superfund monies are not available for remedial -- as opposed to emergency -- action at federally owned sites, the listing of such facilities can have certain effects. The draft priority site list included federal sites, but the then EPA Administrator, Anne Gorsuch, vetoed the idea. EPA is now in the process of developing a priority list for federal sites but due to a lack of information about federal sites generally, EPA could not tell us if Oak Ridge would be on the list.

Additionally, EPA recently listed Y-12 as having the second highest level of emissions of airborne radioactive pollutants of all facilities in the country.

A chronology of events surrounding the claimed RCRA exemption follows:

DOE position regarding application of RCRA and CERCLA to the discharge of hazardous wastes by DOE facilities operating under the Atomic Energy Act (AEA).

Since mid-1980, DOE has taken the position that AEA-related wastes are neither subject to RCRA or CERCLA (i.e., notification for purposes of Superfund.) Only on May 11, 1983, did DOE change its position, but only with regard to CERCLA. On that date, it issued an internal memo acknowledging the applicability of CERCLA to AEA-related wastes. There follows a chronology of significant events relating to DOE's jurisdictional provisions.

Event	Source
DOE Office of Chief Counsel at Oak Ridge takes position that hazardous waste co-contaminated with nuclear waste are exempt from RCRA.	July 24, 1980 legal memo.
DOE/ORO recognizes that "EPA may not grant us [Oak Ridge] a final permit to operate some of our current facilities."	Memo dated 8/18/80 from R. J. Hart, Oak Ridge Manager, to Bryan Siebert at p. 3.
DOE/ORO recognizes that application of RCRA to AEA facilities could cost as much as $100 million over 5-10 year period. Rather than having to establish that DOE waste disposal requirements are equivalent to RCRA, DOE takes position that AEA facilities are exempt.	Memo dated 9/9/80 from J. P. Wing, DOE Environmental Protection Branch to W. H. Travis, Director, DOE Safety and Environmental Control Division.
DOE Office of Environmental Compliance and Overview questions rationale of exempting from RCRA wastes that have not been co-contaminated.	10/7/80 memo from Thomas C. Frangas, Director, DOE Office of Environmental Compliance and Overview to Stephen H. Greenleigh, DOE Assistant General Counsel.
DOE, through its Office of General Counsel, advises EPA of DOE's position	11/14/80 letter from Stephen H. Greenleigh, DOE Assistant General

that RCRA does not extend to DOE programs operated under the AEA, irrespective of co-contamination.	Counsel for Environment, to James Rogers, Associate General Counsel, EPA.
DOE takes position that June 9, 1981 CERCLA notification requirements are inapplicable to wastes from DOE waste management facilities associated with AEA programs.	2/17/81 DOE memo from Thomas Frangas to Stephen H. Greenleigh.
DOE advises field offices that waste management facilities associated with AEA programs need not respond to EPA under CERCLA. Instead, DOE requests that completed forms for "exempt" AEA facilities be forwarded to DOE HQ for planning purposes.	5/14/81 DOE memo from D. E. Patterson, Acting Director, Operational and Environmental Safety Division to field organizations.
DOE provides CERCLA notification to EPA region IV. Notification acknowledges that the ORNL, Y-12 and CARL sites reflect both RCRA-regulated, e.g.mercury at Y-12, and "AEA-exempt" wastes. However, no special reference is made to mercury spill problem.	June 9, 1981 DOE notification to EPA Region IV.
DOE advises Tennessee Department of Public Health, Division of Solid Waste Management, that DOE's Oak Ridge facility is exempt from both RCRA and Tennessee's hazardous waste management program.	July 22, 1982 letter from DOE to Tennessee Division of Solid Waste Management; followed by September 21, 1982 letter to the same effect.
DOE and EPA Office of Federal Activities (OFA) draft proposed MOU which, if implemented, would exempt DOE AEA-related hazardous wastes from RCRA.	December 18, 1982, Memo from EPA Region IV Administrator to Paul Cahill, Director of EPA OFA, objecting to proposed MOU and asserting Region's view that RCRA governs AEA-related wastes.
Tennessee advises DOE that mercury-contaminated sediments have shown up in Oak Ridge garden plots.	March 18, 1983 undocumented communication.
DOE internal memo acknowledges necessity of reporting "additional data" regarding Y-12 mercury releases to EPA pursuant to CERCLA notification requirements.	March 18, 1983 DOE memo from Chris Bird, Environmental Protection Branch to Stan S. Stief, Acting Chief, Environmental Protection Branch.
In an apparent reversal of its 5/14/81 position asserting that CERCLA notification was not required for AEA-	May 11, 1983 memo from DOE Assistant Secretary William A. Vaughan, to DOE Field

related waste management facilities, (see reference, above), DOE advises its field offices as follows: o "The Department has not asserted any exemption from the reporting of inactive hazardous waste sites ... for any of its AEA-regulated facilities." o The above will apply whether or not EPA accepts DOE's position regarding RCRA exemption for AEA-regulated wastes.	Organizations.
EPA Acting General Counsel concludes "RCRA does apply to DOE facilities, including those operated under authority of the Atomic Energy Act .... However, specific RCRA regulations may not apply to some aspects of DOE operations, if it is determined, on a case-by-case basis, that the application of those regulations would be inconsistent with the requirements of the AEA. In addition, RCRA does not apply to 'source, special nuclear or by-product materials' as defined by the AEA." (footnote omitted)	June 22, 1983 memo from A. James Barnes, Acting General Counsel, EPA, to Pasquale A. Alberico, Acting Director, Office of Federal Activities, re: RCRA Regulation of Wastes Handled by DOE Facilities.

APPENDIX B

Department of Energy
Oak Ridge Operations
P. O. Box E
Oak Ridge, Tennessee 37831

September 2, 1983

Honorable Albert Gore, Jr.
Chairman, Subcommittee on
Investigations and Oversight
U. S. House of Representatives
Suite 2321
Rayburn House Office Building
Washington, D. C. 20515

Honorable Marilyn Lloyd
Chairman, Subcommittee on
Energy Research and Production
U. S. House of Representatives
Suite 2321
Rayburn House Office Building
Washington, D. C. 20515

Dear Ms. Lloyd and Mr. Gore:

Attached hereto, to supplement the record of your July 11 hearing in Oak Ridge, please find my answers to the questions transmitted by your letter of August 12, 1983. Two of the questions (32 and 37) were reformulated in a telephone conversation of August 29 between Adam Finkel and Lewis Ventre of your staffs and Bill Bibb and Jim Foutch of my staff. In that same conversation, it was agreed that my answers would be expected by September 6.

I want to take this opportunity to again express my appreciation for the July 11 hearing. I believe the hearing helped to bring out the many facts and concerns regarding a very complex matter, and should result in a more focused approach to resolving the problems.

If I may be of further assistance in any way, please do not hesitate to contact me.

Sincerely,

Joe La Grone
Manager

CC-10:JLF

Attachment:
As stated

1. QUESTION. As the Oak Ridge Operations Manager, do you feel that the Oak Ridge National Laboratory, which carries out many programs under my Subcommittee's jurisdiction, is complying with all Federal and state environmental requirements in terms of the release of effluents at White Oak Dam? Would you note whether there is any significant difference in compliance with respect to radiological versus non-radiological releases?

While we believe, legally, ORNL is in compliance with radiological standards, DOE, the State of Tennessee and EPA desire reductions in the radioactivity level of the effluent leaving White Oak Dam. However, since more than 90% of the radioactivity in the effluent is attributable to old burial operations and contaminated stream and lake sediments, resolution of the problem is not a simple matter. DOE has spent more than $50 million over the past 10 years on corrective measures to reduce the levels of radioactivity released to the environment at White Oak Dam, and a great deal of money, effort and research will continue to be devoted to reducing these radioactive effluent levels. Because of the complexity of the problem, improvements will be slow, but they should be generally continuous.

With regard to non-radiological discharges, effluents from White Oak Lake are routinely monitored for several non-radiological contaminants and the effluents have been well within standards. No concentrations above the limit of detection have been measured for mercury, chromium and zinc. The limit of detection is 20% of the Tennessee stream guideline. Nitrate concentrations are also measured, and the highest reading was 72% of the Tennessee stream guideline of 10 ppm.

The state and EPA just recently concluded a compliance evaluation of ORNL. Based on our discussions, we expect that White Oak Dam will be considered as a NPDES permit location with appropriate parameters. The compliance report is expected by mid-September.

2. QUESTION. Insofar as there is mercury contamination of ground water in the vicinity of the Y-12 Plant, what is the status of monitoring such mercury levels?

An extensive effort has been underway for the past three months to characterize the underground mercury situation at Y-12. This effort began with the award of a contract for a groundwater analysis study, and has been expanded with the award of a contract for a drilling program to locate mercury deposits and/or contaminated groundwater. This effort includes groundwater monitoring. In addition, wells associated with waste disposal areas are being sampled for mercury content. This comprehensive evaluation of groundwater transport will, among other things, help determine long term monitoring requirements. We expect the results of these studies to be available by the end of the year.

3. QUESTION. Would you give us some rough timetable for reaching an agreement with EPA and the State of Tennessee as to what must ultimately be done regarding mercury contamination and the NPDES permits? Will the Y-12 MOU serve as a model for other environmental compliance agreements?

We are unable at this time to state a timetable in which we would have confidence. With regard to the mercury contamination problem, the Interagency Task Force, composed of representatives from DOE, EPA, Tennessee, TVA, and USGS, is still at an early stage of its activities. While DOE is taking appropriate interim measures, as discussed later herein, DOE will await Task Force recommendations for any ultimate remedial action. Since the experts are of the opinion that there is no immediate health hazard, we expect the Task Force to be very deliberate in its activities. Because of the additional study that the Task Force will perform, we do not expect final recommendations until sometime after mid-1984 or 1985.

With regard to NPDES permits, as a result of the ongoing effort to characterize the Y-12 Plant's hundreds of small process discharges and its complicated area source discharges, it is now obvious to all the parties that the NPDES repermitting process is a more onerous task than originally anticipated and that it will take many months to accomplish. As a result, the parties agree that the MOU deadline of December 1983 for submission of NPDES applications for all discharges is impossible to meet. We are working with the EPA and State of Tennessee to establish more realistic deadlines, as well as to determine sampling requirements for our more difficult source characterizations.

It is likely that the Y-12 MOU will serve as a model for other environmental compliance agreements among ORO, EPA and the State of Tennessee. The MOU concept serves very well as a workplan for achieving compliance, particularly in situations such as at Y-12 and ORNL where uncertainties exist as to the time necessary to accomplish certain tasks or studies. The State of Tennessee has recently expressed a desire for a more formalized, more legalistic document, in the form of an Order, and we are working with the State to accomplish this, given the time uncertainties that still exist with regard to completing actions under the Y-12 MOU.

3.(sic) QUESTION. Has DOE evaluated the health and safety impact on the public and DOE's employees due to the mercury releases at the Y-12 facility? What have your findings been?

With regard to impact on the public, the primary potential pathway to man is through eating fish. For several years, DOE has monitored fish taken from the nearest downstream locations in a likely fishing area (Poplar Creek and the Clinch River). Mercury levels in fish there have been elevated, but seldom exceeded the FDA 1 ppm action guideline. Upstream in East Fork Poplar Creek, however, mercury in fish levels have often exceeded the FDA action guideline, but the fishing activity in this area is generally considered to be minor. Prior to 1982, East Fork Poplar Creek's water quality was significantly degraded due to the presence of an inadequate municipal sewage plant, which inhibited development of fishery in the upper regions of EFPC. East Fork Poplar Creek was posted against consumption of fish by the State in November 1982, so this pathway is no longer considered a source of impact on man.

Data is also being collected to evaluate lesser potential pathways to the public, e.g., vegetables and airborne mercury. Concentrations found to date are very low. This information has been, and continues to be, supplied to the state for its evaluation and interpretation, and to EPA and the public for their information. Research activities include sediment feeding studies by the Oak Ridge Research Institute, and pathways analyses by Battelle Columbus Laboratories. All of the foregoing data and analyses have been furnished to Subcommittee staff members. There appears to be a consensus of the experts that there is no immediate threat to public health due to the mercury releases and the resultant contamination.

With regard to impact on DOE contractor employees, the evaluation of the impact of mercury exposures to Y-12 employees has included the following activities:

a. Routine Physical Exam Program. During the years that the mercury process was utilized (1953-1963), employees exposed to mercury were examined every six months for clinical observations of mercury toxicity. Employees were restricted from working in areas with potential mercury exposure if they had albuminuria, kidney problems, or hypertension. Workers were removed from mercury exposure if urinalysis showed positive results for mercury exposure exceeding recommended levels.

b. 1974 Urinary Bioassay Study. In July 1973, Dr. Zeb G. Bell, NIOSH mercury consultant, requested and received approval to do a bioassay study of Y-12 employees exposed to mercury. The study covered the period from 1953 to 1966 and included use of Y-12 urinalysis data, medical histories of employees, and follow-up physical exams that included parameters recommended by NIOSH personnel. None of the employees in the study exposed to mercury showed any chronic effects of mercury exposure.

c. DOE Health and Mortality Study. Oak Ridge Associated Universities is under contract to DOE to conduct the DOE Health and Mortality Study to determine what effects working with radiation and radioactive materials has had on workers at DOE facilities. The original scope of the study, initiated in 1964, was changed to include exposures to industrial chemicals also. While the study is not yet completed, ORAU conducted a preliminary analysis of mortality among Y-12 workers due to the current interest in Y-12 mercury exposures. This analysis showed no statistically significant evidence of symptoms of exposures to mercury, or statistically significant evidence of unusual mortality rates.

d. Evaluation of Workers Currently Exposed to Mercury. Y-12 workers currently having a potential for exposure to mercury, through working in mercury contaminated process buildings, continue to be monitored by Y-12 health protection activities. Air in workplaces formerly associated with mercury processing is continuously monitored, and contamination levels in air continue to be well within acceptable levels. No evidence of adverse health effects has been observed.

e. Mercury Workers Follow-up Study. Union Carbide is developing a protocol for a follow-up and expansion of the 1974 study, utilizing new techniques and outside consultants to determine whether, 20 years after mercury exposure, there have been effects.

4. QUESTION. If the mercury lies in the sediment bed of East Fork Poplar Creek, should it be dredged out, and if not, why not?

Whether dredging of East Fork Poplar Creek to remove mercury deposits is an appropriate action is expected to be considered by the Interagency Task Force in detail. Consideration will be given to whether greater environmental damage might result from the dredging activities, possibly resulting in a redistribution and dispersion of the mercury, than from leaving it in place. In a somewhat similar situation at Saltville, Virginia, the decision was to not disturb the mercury deposits. DOE has no position on the question, except that it will await the recommendation of the Task Force.

5. QUESTION. Is the Department of Energy still using mercury in any process at Y-12 or any other facility in the Oak Ridge Complex?

Mercury is not used in significant quantities in any process at the ORO facilities. A small amount of mercury nitrate is still used at Y-12, added to nitric acid as a catalyst in the dissolution of uranium and uranium alloys. Mercury in small amounts is used at all three plants (Y-12, ORNL and OR Gaseous Diffusion Plant) for standard laboratory, instrument and related uses common to manufacturers and laboratories.

6. QUESTION. What steps does DOE feel are necessary to ensure the protection of the public health and safety in regard to the mercury contamination problem?

The steps DOE considers necessary at this time to assure the protection of the public health and safety have already been taken or are planned for the immediate future. These are the posting of East Fork Poplar Creek against consumption of fish; the placing of top soil on the contaminated areas at Jefferson Junior High School; and the planned placement of top soil on certain locations at Robertsville Junior High School. Based on the advice of experts, and after consultation with the State of Tennessee and EPA, no other protective measures appear to be appropriate at this time. We may, however, take other actions as the result of Interagency Task Force recommendations and/or because of findings in our continuing sampling and studies.

7. QUESTION. Does DOE need further appropriations to initiate any activity that will protect the public health and safety relative to mercury contamination?

DOE currently has, and will continue to have, requirements for funding to support remedial actions related to mercury contamination to assure protection of the public and employee health and safety. Presently identified needs have been addressed through the DOE budget process. As additional needs are identified, such as when the Task Force makes its recommendations, such needs will be included in ORO's budget requests.

8. QUESTION. Are there any activities or areas relating to environmental pollution in which DOE is not fully complying with the requests of the State of Tennessee or the Federal Environmental Protection Agency?

To the best of my knowledge, ORO has been, and continues to be, completely responsive to all requests from the State of Tennessee Department of Health and Environment and EPA - Region IV. Because this is a continuing relationship, in some cases, we are presently conducting studies or gathering information to answer such requests. I believe, however, that the actions DOE is taking, and the timetables under which the actions are being taken, are acceptable to both TDHE and EPA.

9. QUESTION. Is it the policy of the DOE to comply with the substance of environmental regulations regarding the disposition of toxic wastes, be they state or Federal, regardless of whether DOE is exempted under the law from seeking a license from such an agency?

Yes, that is the policy of DOE, as reflected in DOE Order 5480.2, "Hazardous and Radioactive Mixed Waste Management." This Order establishes hazardous waste management procedures for AEA facilities that follow, to the maximum extent practicable, regulations issued by EPA under the Resource Conservation and Recovery Act of 1976. A copy of DOE Order 5480.2 is attached hereto.

10. QUESTION. Has DOE identified any site outside of the Oak Ridge Complex site that requires remedial action? If yes, please explain.

Yes, as previously mentioned, and as discussed in more detail in answer 20, after discussions with EPA and the State of Tennessee, taking a very conservative approach to assure public health and safety, we determined that interim remedial actions are appropriate near Robertsville Junior High School and Jefferson Junior High School, both in Oak Ridge. Near Jefferson, mercury contamination was the result of East Fork Poplar Creek sediments being used for fill in sewer line construction. Near Robertsville, the mercury contamination was found on a ball field in the floodplain of East Fork Poplar Creek. No other areas in Oak Ridge have been identified for remedial action at this time.

11. QUESTION. Has the policy of the Department changed since 1977 with regard to the release of information concerning environmental pollution? If so, please state what changes have been made and exactly what the policy is.

To the best of my knowledge, there has been no change of agency policy with regard to release of environmental information, although it should be noted that the agency information charter is general, not subject specific. Implementation of a policy, of course, is subject to interpretation and may vary from office to office. As I indicated in my testimony, I believe in openness and candor when dealing with the public, on environmental as well as other matters. I have pledged that ORO will make maximum disclosure of information. We have done that since my arrival in Oak Ridge, and will continue to do so.

12. QUESTION. What is the timetable for DOE's compliance with DOE's, EPA's, and the state's environmental standards? If DOE is not now complying with such standards, is the health and safety of the public adequately protected? What steps are being taken to assure that health and safety is adequately protected?

ORO is dedicated to complying with DOE, EPA and state environmental standards as soon as practicable. Due to the nature of our prior program activities and our aged facilities, however, and considering terrain characteristics, co-contaminated (radioactive and non-radioactive) waste, and uncertainties and inconsistencies with regard to interpretation of related regulations, we cannot at this time meaningfully project when we will be in full compliance. We have no reason to believe that ORO's operations are a significant hazard to the health and safety of the public. We are, nevertheless, increasing our monitoring and evaluation of environmental conditions around our plants to improve verification. While recent facility inspections have shown violations of state regulations, it should be noted that these violations are often the result of new interpretations of regulations which will primarily improve the onsite environment. We are committed to making our 1940 facilities meet evolving 1980 standards, but it is a process that takes time. How much time is impossible to predict with precision.

13. QUESTION. Are those people working at the Oak Ridge Complex adequately protected from any contaminants on the Oak Ridge Complex site? Are any special steps necessary to protect Oak Ridge workers from the discharges?

DOE and its contractors' Health Protection activities are prescribed by DOE Order 5480.1A, titled "Environmental Protection, Safety and Health Protection Program for DOE Operations." DOE and its contractors have been, and continue to be, responsible for assessing the potential health impacts on employees from any physical and/or chemical agent at DOE facilities and for recommending the most effective means of protecting employees from these impacts. Where special steps are necessary to protect the employees from any hazard, these steps (such as use of protective equipment) are taken immediately. A particular action that we are taking with regard to the mercury situation is trying to relocate workers out of the former Alpha 4 process building, not because of any imminent health hazard but because of continuing employee concerns about their potential exposures to airborne mercury, and, as the first step toward decommissioning and dismantlement of the building. A copy of DOE Order 5480.1A is attached hereto.

14. QUESTION. What expertise has DOE brought in, other than DOE or its contractors, to examine the mercury contamination problem? Can you summarize their findings for the Subcommittees?

Through the years, DOE has had numerous experts examine the mercury contamination problem. Initially the concern was with regard to onsite contamination and safety. Those consulted by DOE or its contractors include:

a. Dr. R. Kehoe. A consultant from Kettering Institute, University of Cincinnati, Dr. Kehoe studied mercury contamination and the effectiveness of showers in February 1956. Dr. Kehoe recommended extensive cleanup, maintenance improvement and improvement of ventilation. His recommendations resulted in a reduction of air concentrations of mercury and a corresponding reduction in the levels of employees exposed.

b. The University of Rochester (Dr. Thomas Ealy, AEC-HQ, in conjunction with Dr. Harold Hodge, University of Rochester). AEC funded research at the University of Rochester to explore the usefulness of more sensitive methods for detecting early evidence of kidney damage, such as quantitative determination of urinary proteins. February 1956 results showed: (i) much variation in urinary mercury levels as they relate to mercury exposure, and (ii) poor correlation between urinary mercury levels and mercurialism.

c. Dr. Zeb G. Bell. A NIOSH consultant, Dr. Bell did a urinary mercury bioassay study using Y-12 monitoring data and physical examination follow-up in July 1973. He found no evidence of mercurialism.

d. Dr. Michael D. Utidjan. Union Carbide Corporation (Headquarters') Associate Medical Director and Chief Toxicologist, and main author of the NIOSH Criteria Document for Mercury, Dr. Utidjan was requested to review the mercury situation in Building 9201-4 (Alpha 4) and make a presentation of his findings to the employees working in this building. Workers had been concerned about their potential exposures to airborne mercury. Dr. Utidjan reviewed the industrial hygiene monitoring data, toured the building, and concluded that there was no mercury health hazard in the 9201-4 offices.

Recently, concern has shifted to off-site contamination and public health and safety. Those consulted by DOE or its contractors include:

a. Dr. Thomas Clarkson. Head of the Division of Toxicology and Director of Environmental Health Sciences at the University of Rochester School of Medicine, Dr. Clarkson reviewed the early data regarding contamination of East Fork Poplar Creek, toured the area and then consulted with DOE officials. He was of the opinion that there was no immediate health hazard, and recommended other actions by DOE (studies, analyses, etc.) We have continued to furnish Dr. Clarkson data as it has been developed from the sampling program.

b. Dr. Nathaniel Revis. Director of the Oak Ridge Research Institute, Dr. Revis conducted a sediment feeding study under contract to Union Carbide Corporation. Dr. Revis testified at the July 11 hearing that there was no immediate health hazard from acute ingestion. DOE is presently working with Dr. Revis on a chronic sediment exposure study proposal.

c. National Center for Disease Control, Atlanta, Georgia. CDC continues to be furnished the data generated by sampling and analyses, and has agreed to review the data to determine whether any long term studies or other actions may be appropriate.

15. QUESTION. Would you summarize the facts concerning the Wilson case of alleged mercury poisoning that you alluded to during the hearing?

James C. Wilson, Jr., was employed by Union Carbide Corporation at Y-12 from August 24, 1951, through January 13, 1961, when he was terminated in a reduction-in-force. He was reemployed from August 6, 1962, through August 23, 1962, when he took a voluntary termination.

From August 1953 through April 1954, Mr. Wilson was a process operator in Beta 4, a mercury processing area. His urinary mercury level was consistently below .3 mg/L, the industrial standard. He was transferred out of Beta 4 because of high albumin readings, per standard AEC and Union Carbide Corporation practice for mercury workers. Mr. Wilson had higher than normal albumin readings in a pre-employment physical, which readings had leveled off prior to his employment in Beta 4. When the albumin levels rose again, Mr. Wilson was transferred out of mercury activities.

On July 24, 1972, Mr. Wilson filed suit in the U. S. District Court in Knoxville, Tennessee, against his former employer, Union Carbide Corporation, alleging that he was suffering from mercury poisoning discovered in August 1971. At a full trial in November 1972, Dr. William Olson of Vanderbilt University testified that Mr. Wilson's condition "could be mercury poisoning," but he could not say with a medical certainty that it was. Dr. Robert Lash of Knoxville testified that the "urinalysis data showed no potential for injury." The Court rendered a judgment in favor of Union Carbide Corporation in March 1973, concluding that Mr. Wilson's medical condition did not arise out of his employment.

Mr. Wilson has recently filed an action against the United States in the U. S. District Court in Knoxville, claiming mercury poisoning.

16. QUESTION. What do you feel have been the DOE's "lessons learned" in handling this mercury contamination question and its potential impact? Why did it require an outside "Freedom of Information" request to bring about release of the figure

for the total amount of mercury unaccounted for from Y-12 operations?

I believe the primary lesson learned, or affirmed, is that openness is the best policy. Get the facts out where they can be examined. If there is a problem, solve it, but prevent unnecessary anxiety and loss of confidence and credibility by making a full disclosure. This openness must extend to the public, as well as to the State and other federal agencies. DOE's credibility was damaged in the mercury situation because of its lack of openness. We must earn anew the trust and confidence of the public and the agencies with which we work. I believe we are well embarked on that course, but the journey is far from over.

As I indicated in my testimony, I do not know why the unclassified portions of the 1977 report were not made public. At my request, ORO's Office of Performance Evaluation and DOE's Office of Inspector General are both looking at that issue. I will be glad to make their conclusions available when I receive them.

17. QUESTION. What is the DOE position with respect to whether the present data and analysis is a solid basis for recommending any type of remedial action with respect to the mercury contamination? Is there any estimate of cost benefits of such remedial actions?

I believe that the presently available data base is not adequate for making determinations regarding all of the remedial actions that may be required with respect to the mercury contamination. Some remedial actions are currently underway, and programs to obtain the data required to identify other required remedial actions are either underway or planned. The Interagency Task Force will eventually be making recommendations about ultimate remedial actions. At the present time, there are no estimates of the costs or the benefits of potential remedial actions.

18. QUESTION. Are you satisfied that sufficient monitoring activity is going forward with respect to mercury levels in the Oak Ridge area? Are we availing ourselves of the environmental, health and safety expertise of the Oak Ridge National Laboratory in addressing the mercury question, and, for that matter, any other potential environmental problems?

I believe, based on the available information, the expanded monitoring and sampling program that ORO and its contractors are now engaged in is sufficient. If, as the activity continues, we, the Task Force or regulatory agencies identify gaps in the program, we will move promptly to expand the program further.

The expertise of ORNL is being called on, as appropriate, to consider potential environmental problems at ORO. For instance, ORNL has provided radiological environmental monitoring off-site for the Oak Ridge Gaseous Diffusion Plant and Y-12 for many years.

19. QUESTION. Is it the DOE position that there is little probability of the spilled and dissolved mercury getting into the food chain and being taken up by humans? What assurances do we have from hard data and laboratory experiments that such a pathway is unlikely?

Based on available information and the opinion of experts, other than through fish consumption, there does not appear to be a major mercury pathway to humans. Attached hereto is the latest composite of plant uptake analyses, including garden data, showing no significant uptake. The laboratory experiments of Dr. Revis involving sediment feeding have already been mentioned, as well as his testimony at the July 11 hearing. Those experiments showed no hazard from acute sediment ingestion at the mercury levels found in the Oak Ridge area. Notwithstanding these favorable preliminary results, we are continuing with activities to confirm the lack of a health hazard from mercury contamination, such as consultation with CDC and the studies of Dr. Revis at the Oak Ridge Research Institute.

20. QUESTION. How are you handling the mercury contamination located off the Oak Ridge reservation, e.g. at the Jefferson Junior High School?

We will await the Interagency Task Force recommendations prior to taking action offsite at most locations. At Jefferson Junior High School, however, after consultation with EPA, the Tennessee Department of Health and Environment and the City of Oak Ridge, we placed top soil on the contaminated area in order to assure that there is no potential hazard to the school children. Present plans call for application of top soil also to the mercury contaminated areas at Robertsville Junior High that are routinely used by students. Additional remedial measures at these sites, if any, will await recommendations of the Task Force.

21. QUESTION. The Legal Environmental Assistance Foundation charges that although DOE was required by law to do so, it did not report the mercury releases to EPA in 1981 under the

Superfund notification requirements. Were you required to report such mercury releases to the EPA, and if so, did you, and if not, why not?

Because of the great amount of data that we have developed in recent months regarding the mercury releases and mercury contamination, ORO is preparing to file Superfund notifications with EPA.

22. QUESTION. The Legal Environmental Assistance Foundation charges that DOE was required to include mercury as a pollutant in the Clean Water Act discharge permits, but did not so include them. What is DOE's position on this?

The NPDES permit for New Hope Pond was issued in 1975, and contains limited parameters. The permit was based on an application submitted under the Refuse Act Permit Program, administered by the Corps of Engineers. The RAPP permit application indicated a slight mercury content in the discharge in 1971. The decision in 1975 by EPA and AEC was that the proposed (now existing) permit parameters were adequate, based on what was then known. With the greater knowledge we now have, mercury is considered an appropriate parameter for some of the permits that will be issued for Upper East Fork Poplar Creek. Which particular permit points will have this parameter will be decided by EPA, TDHE and DOE, based on effluent constituents at each point.

23. QUESTION. Does DOE monitor the quality of the approximately 20 million gallons of groundwater ORO draws each month? Is there a possibility that groundwater discharged to EFPC could increase the chemical pollutant load in this water body?

The estimated 20 million gallons of groundwater is not "drawn" by Y-12. It is naturally occurring in-leakage to the storm sewer system, including the bed of the creek, and constitutes less than eight percent of the total water flow through the plant. While we consider it unlikely that this groundwater increases the chemical pollutant load in EFPC to any discernible degree, we are installing a groundwater monitoring network designed to address this concern.

24. QUESTION. Please qualify which water samples analyzed for Hg were first filtered and which were not. Did all filtering cease after the mid-1970s or do some more recent data reflect filtering?

During a 3½ year period from January 1974 to June 1977, EFPC water samples were filtered before analyzing for mercury so that only the soluble fraction was measured. During that period, the soluble portion discharged to the creek measured a total of 324 pounds. That discharge should probably be doubled to more properly estimate the total mercury discharge, i.e., 648 pounds. The practice of measuring only the soluble fraction of mercury by means of filtering the sample before analysis was restricted to this particular period (January 1974 to June 1977), and it was changed back to total mercury in June 1977. In the period of time before, 1950 to 1973, and in the period after, 1977 to 1982, the analyses reflect the total amount of mercury in the sample, not the soluble portion only.

Another source of some confusion over sample "filtering" has been the correct observation that all samples for mercury in water were filtered by the Laboratory during the period 1957 through 1967. The first half of this period was when the heaviest mercury discharges occurred. Some people have concluded from this that, since all the samples were filtered, only soluble mercury was measured. This is incorrect. The Lab procedure was to filter all water samples through a paper impregnated with cadmium sulfide, the purpose of which was to collect (by precipitation or filtration) all of the mercury in the sample, of any form, on the filter paper. The filter paper was then measured for total mercury content in the subsequent steps of the analysis. Samples during this period were filtered, but in order to measure the total mercury present, not to measure only the soluble fraction as during 1974-1977. Other analytical procedures were used before 1957 and after 1967.

25. QUESTION. DOE and the city of Oak Ridge obtained different results for Hg content when sampling the backfilled sewer line recently. Can you explain the apparent discrepancy and its significance for DOE's monitoring program?

There is not really a discrepancy. The results referred to in the question represent samples taken in different locations and by different sampling techniques. The mercury contamination has been found to be unevenly distributed, and sampling locations a foot apart may yield significantly different results. When samples were taken by ORAU in the same vicinity as those taken by the City of Oak Ridge, sample analysis results agreed within ± 15%, which is within expected variations.

As a quality assurance check, on a random sample basis, ORAU has been determining mercury by neutron activation analysis, the results of which have shown excellent agreement with the results of the chemical procedure. In addition, ORAU has split samples with the State of Tennessee for independent analyses. The ORAU analyses were slightly higher than those by the State of Tennessee, but still in good agreement therewith.

Since there have been no real discrepancies noted, when sample analytical results have been compared on a proper basis, we consider that the differences previously noted have no real significance, other than to confirm the accuracy of the monitoring program in effect. Proper quality assurance checks will continue to be made on all aspects of the monitoring program.

26. QUESTION. Has DOE made any effort to locate or sample residential groundwater wells after testing revealed on-site groundwater contamination? If not, why not?

ORO has performed sampling on four wells, two house wells where the water is used for human consumption and two farm wells that are not in use. The ORAU results for the home wells were less than 0.1 ppb mercury for both; the ORAU results for the farm wells was less than 0.05 ppb for both. ORAU increased its analysis sensitivity by a factor of two during the three months between sampling the home wells and the farm wells. An analysis of the same samples by Stewart Laboratories showed less than 1 ppb mercury for all samples. One of the residence wells contained lead slightly exceeding drinking water standards, and the other residence well exceeded secondary drinking water standards for color, manganese and iron. These secondary standards relate only to the aesthetic qualities of the water. While we have no reason to suspect continuity between Y-12 groundwater and these wells, we will be following up on the data. In particular, we will be coordinating additional sampling with the City of Oak Ridge since these residences are near a former municipal sanitary landfill.

27. QUESTION. What efforts will DOE undertake to monitor the movement of spilled mercury under the Y-12 plant, knowing that encounters with acidic groundwater could decouple mercury from soil? Could you provide a detailed prospectus on how DOE intends to monitor the Oak Ridge area to make sure that the biomethylation or uptake of mercury does not increase in the future through changes in bacterial populations or water quality changes making certain reaches more hospitable to fish (or larger fish)?

It is the opinion of our hydrogeologic experts that there is little probability, considering the nature of the East Tennessee geologic formation, that there is acidic groundwater under Y-12. As I mentioned in my statement for the record, I am informed that monitoring the movement of mercury in East Tennessee geologic formations is very difficult. We have, however, undertaken an extensive drilling program in an attempt to locate mercury deposits or contaminated groundwater. The State and EPA commented on our drilling plan, and their suggestions have been factored into our program.

With regard to future levels of mercury in fish, it is impossible at this time to provide a detailed monitoring prospectus. The Interagency Task Force will be addressing long-term monitoring needs, and will factor biomethylation into its remedial measures recommendation. For DOE to try now to develop a separate prospectus would be inappropriate, since we are participating in the Task Force. When the monitoring program is issued by the Task Force, a copy will be provided to the Subcommittees.

28. QUESTION. Whose decisions at DOE resulted in the ORNL scientists conducting extensive research projects in Virginia and Spain on mercury effects, but not in the Oak Ridge environs?

The work in Virginia was a National Science Foundation funded project under an interagency agreement between the National Science Foundation and the Department's predecessor agencies. It originated on the basis of a proposal from the Oak Ridge National Laboratory, submitted to Oak Ridge Operations for transmission to NSF. Since the work proposed was closely related to the agency research program on trace elements in the environment, ORO concurred in ORNL undertaking this work.

The project in Spain was also funded by the National Science Foundation. It was part of an international assistance program with Spain that included work to define the magnitude of the health and environmental problems associated with mercury mines in Spain. NSF specifically requested ORNL assistance through the Energy Research and Development Administration, one of our predecessor agencies. Since the ORNL technical expertise was available, this assistance to NSF was approved at both ORO and Headquarters.

Why ORNL capability was not brought to bear more directly and to a greater extent on the Y-12 situation is not clear to me.

29. QUESTION. Why did the Elwood report not study the EFPC, when DOE knew that process wastes were one major source of Hg releases? Why was the Elwood report designated "business confidential"? Who was involved in these decisions at DOE?

As I mentioned in my statement, the Elwood Report matter is one of the particular areas where I have requested a full inquiry by DOE's Inspector General, supported by ORO's Office of Performance Evaluation. When the results of that inquiry become available, I will gladly furnish them to the Subcommittees.

30. QUESTION. What significance if any can be attributed to the slightly higher Hg values in fish taken in 1982 than the 1976-77 readings? Will attempts be made to generate trend analyses of Hg uptake?

No significance can be attributed to the slightly higher fish values from a statistical standpoint. Statistical analysis of the pooled data from 1976, 1977 and 1982 provide no basis for a conclusion that levels are either decreasing or increasing with time. In the pooled 1976/1977 fish data from the area near the East Fork Poplar Creek/Poplar Creek junction, there were 3 fish over 1.0 ppm, compared to 3 in the 1982 group. Averages were 0.38 (1976), 0.32 (1977) and 0.44 (1982). In the pooled data for the area near Poplar Creek/Clinch River junction, there were 4 fish over 1.0 ppm in 1976/1977 versus none in the 1982 group, and the averages were 0.41 (1976), 1.25 (1977) and 0.14 (1982). Statistical analysis will continue to be applied to the data at hand, and to that subsequently acquired, to determine any trends or changes as a function of time. It is expected that this will also be a matter for consideration by the Interagency Task Force.

31. QUESTION. What was the extent of DOE's involvement in or knowledge of ORNL's actions in the Stephen Gough incident, including the decision to demand the return of samples and notes from OSGS and the subsequent "freeze" imposed on mercury data collections?

I am not aware of any DOE involvement or knowledge before the fact of ORNL's actions regarding Steven Gough. You will recall, however, that I have specifically requested DOE's Inspector General, supported by ORO's Office of Performance Evaluation, to make a complete inquiry into the Gough matter. I will make the results of that inquiry available to the Subcommittees.

On July 19, 1983, I requested that ORNL management remove from Mr. Gough's personnel file any written reprimand related to Mr. Gough's taking of environmental samples near the Y-12 Plant in December 1981. I made the request because I do not believe the reprimand was necessary or appropriate, considering Mr. Gough's activity and the circumstances. ORNL management agreed to the removal of the reprimand, and we have so informed Mr. Gough.

*32. QUESTION. Can you explain why the draft 1982 EIS for Segment O analyzed radionuclide effects from possible dredging of Clinch River sediments, but made no mention of mercury in these sediments? Who was involved in the decision to restrict the scope of the EIS?

I am informed that the draft EIS for Segment "O", on the bank of the Clinch River opposite the Oak Ridge Gaseous Diffusion Plant, analyzed radionuclides in sediments of the Clinch River because radionuclide concentrations were considered to be a potentially sensitive health and safety topic, one that deserved examination in the EIS. I am also informed that there was no intentional restriction of the scope of the EIS to exclude consideration of mercury in the sediments. It, reportedly, was not even the subject of discussions or exchanges among Battelle Columbus, DOE and Union Carbide because its presence at those concentrations in the Clinch River was not perceived as a potential problem. There apparently was not a conscious deletion or elimination of coverage of mercury in Clinch River sediments in the EIS; it simply was never considered or mentioned by those involved in scoping and preparing the EIS as a topic for inclusion, except as regards Poplar Creek. DOE furnished Battelle and Koppers information about mercury concentrations in Poplar Creek because of the potential for a bridge across Poplar Creek. Analysis of a railroad crossing of Poplar Creek was deferred in the draft EIS because Koppers had not chosen from among three routes, two of which would not have crossed Poplar Creek. Analysis of a Poplar Creek crossing would have caused mercury to be a topic in the EIS, because of the higher concentrations in Poplar Creek than in the Clinch River.

If the EIS were being prepared today, because of the public interest in mercury contamination, I have no doubt that the matter of the presence of mercury in sediments would be addressed.

33. QUESTION. Barry Sulkin of TDHE indicated he believes he saw "leaking canisters of PCBs stacked next to the industrial ditch" during an inspection earlier this year. If this was a problem, (how) has it been rectified?

One of Mr. Sulkin's visits to the Y-12 Plant was on September 14, 1981, and it is highly likely that during that visit he did observe drums with PCB labels stacked near the industrial ditch. Rather than leaking drums, however, these would have been empty drums resulting from a program to clean up PCB-contaminated oil, a program which was conducted in an area close to the industrial ditch in the east end of Y-12 during the period September 7 through October 25, 1981. The work was performed by Sun Oil Company, using an EPA-approved process. We know of no other circumstances that would have resulted in Mr. Sulkin's recollection.

34. QUESTION. Has DOE investigated the cost and feasibility of having commercial waste management firms handle Oak Ridge waste streams until the CPCF goes on-line? With an extra step for uranium recovery or improved waste segregation, would it be feasible or desirable to find an experienced commercial firm to handle chemical wastes?

DOE has investigated, without success, the possibility of obtaining commercial waste treatment of co-contaminated Y-12 waste streams. It is not economically feasible to segregate out the radioactivity, so we are faced with a situation that no commercial source is available. The situation is similar to that of radioactively contaminated PCBs, where, because of the lack of a commercial disposal method, we have embarked on constructing our own PCB incinerator. We are continuing to examine the possibility of commercial disposal of those hazardous waste streams that are not co-contaminated, but these are relatively few in number and small in volume.

As you may know, we have identified unutilized waste treatment capability at the OR Gaseous Diffusion Plant that can treat part of the Y-12 waste stream until CPCF is on-line. We have submitted NPDES applications to EPA and TDHE for this alternate treatment, and we are all very encouraged as to its feasibility for near-term treatment. This treatment capability became available due to the recent completion of the ORGDP upgrading program. With regard to CPCF, we have now received bids for construction of the facility. We have been able to escalate the construction schedule, and the expected completion date is now spring 1985.

35. QUESTION. What standards does DOE apply to determine whether a waste is "radioactive" and arguably exempt from RCRA? Is there any de minimus level?

As you are aware, it is the Department's position that the wastes produced as the result of the Atomic Energy Act activities are exempt from RCRA.

The definition of "Radioactive Waste," set forth in DOE Order 5480.2.4.j., is:

> Radioactive Waste. Solid or fluid materials of no value containing radioactivity; discarded items such as clothing, containers, equipment, rubble, residues or soils contaminated with radioactivity; or soils, rubble, equipment or other items containing induced radioactivity such that the levels exceed safe limits for unconditional release.

Under this definition, depending on the type waste, there may be a *de minimis* level, such as for material for which NRC has set exempt concentration levels.

36. QUESTION. Did DOE fully evaluate the performance and integrity of its disposal sites before asserting an exemption from RCRA on the grounds that practices at Oak Ridge were substantively equivalent? How was this evaluation accomplished or why was it not undertaken? If there is an evaluation, please provide a copy for the record?

The agency position on the Atomic Energy Act exemption under RCRA is not based on the existence of an equivalent program at Oak Ridge, but on the following language of RCRA:

> Nothing in this Act shall be construed to apply to (or to authorize any State, interstate, or local authority to

> regulate) any activity or substance which is subject to...the Atomic Energy Act of 1954 (42 U.S.C. 2011 and following) except to the extent that such application (or regulation) is not inconsistent with the requirements of [the Atomic Energy Act].

Because of this exemption, DOE established a substantially equivalent RCRA program under DOE Order 5480.2., which ORO is implementing.

To the best of my knowledge, DOE did not evaluate the performance and integrity of its multitude of disposal sites to determine exempt status under RCRA. The sites were constructed in accordance with acceptable practices at the time they were opened. Today's troublesome burial grounds at Oak Ridge predate RCRA. Many of them were constructed in the 1940's and 1950's, a time when standards and practices were much more lenient and environmental concerns were much less. That is not an excuse, but a recognition that bringing old facilities into compliance with modern standards, some of which are still being formulated, is not an overnight process. It is, however, a process that we at ORO are committed to completing as quickly as practicable.

*37. QUESTION. Why did the December 1982 EA (prepared by Battelle) say that total mercury levels in stream sediments were around 25 ppm? Did Battelle not have access to data showing values of 300 ppm and higher, such as contained in the October 1982 Van Winkle report and the Clinch River/Poplar Creek Bottom Sediment Report covering 1975-1981?

As I stated in my testimony, I believe this report is defective. It is one of the matters into which I have requested an inquiry by DOE's Office of Inspector General, supported by ORO's Office of Performance Evaluation. When results of the inquiry become available, I will furnish them to the Subcommittees.

38. QUESTION. You provided data to EPA recently showing that about 60,000 gallons per month of your chemical waste streams at Y-12 could be managed without resorting to direct creek discharge. Given that Y-12 discharges about 11,000,000 gal./month of chemical waste into EFPC, should we interpret this submittal to mean that DOE has examined all other waste streams and has no feasible alternative but to keep discharging the remaining 10,940,000 gallons until the CPCF is built?

The data supplied to EPA showing that 60,000 gallons/month of Y-12 chemical wastes could be managed without resorting to direct creek discharges is not directly comparable to the 11,000,000 gallons/month estimate of chemical wastes being discharged to UEFPC. Few, if any, of the various streams included in the 11,000,000 gallons/month figure are measured, and must be estimated. The 11,000,000 gallons/month for the total of these streams is, therefore, also an estimate. The 60,000 gallons/month is an estimate of the amount of concentrated chemical wastes that would not be discharged to the S-3 Ponds or to UEFPC. There would probably be no noticeable change in the overall quantity of the discharges to UEFPC (11,000,000 gallons/month) but the degree of contamination would be lessened.

Efforts have been made to determine the volumes of the streams included in the 11,000,000 gallons/month estimate. The largest stream is rinse water from the second rinse of parts in the plating shops. This flow is estimated to be 8,400,000 gallons/month. Other streams include the plant laundry, 400,000 gallons/month; waste going to the S-3 Ponds, 225,000 gallons/month; and other miscellaneous streams, 100,000 gallons/month. The difference between the 11,000,000 gallons/month and the total of the above streams, 9,125,000 gallons/month, is due to estimating errors.

The 60,000 gallons/month of chemical wastes which can be handled without resorting to direct discharge to UEFPC constitute the more concentrated chemical waste streams, and the removal of these streams would, therefore, have the greatest immediate effect on the degree of contamination of the discharged water. Currently, all waste streams going to UEFPC are being characterized with a goal of (1) possible elimination, (2) treatment at the source, or (3) discharge to the stream. All chemical waste streams will be subject to permits from EPA. This characterization work is currently in process, with data being provided periodically to the State and EPA as it is obtained.

39. Are there any other documents which bear on the role of DOE in the mercury pollution problems which you believe the Subcommittees have not received and which would shed light on any of the issues raised at the hearing?

The only documents, in addition to the many we have furnished the Subcommittees, that come to mind are the annual Y-12 environmental management appraisal reports for 1974 through 197~~7~~8. We are including copies of these appraisal reports, together with Union Carbide's response to each. *

*The above mentioned documents are on file in the Subcommittee offices.

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* Questions 32 and 37 were reformulated in a telephone conversation between Adam Finkel and Lewis Ventre of the two Subcommittee staffs and Bill Bibb and Jim Foutch of ORO on August 29, 1983.

PLANT UPTAKE OF MERCURY FROM SOIL

PLANT			SOIL		
TYPE	SAMPLE NO.	CONCENTRATION	SAMPLE NO.	CONCENTRATION	PLANT/SOIL
Carrot	83-0126	.013 ppm	83-0121	.90 ppm	1.4 E-2
Onion	83-0190	0.008	83-0189	10	8.0 E-4
Brocolli	83-0124	.003	83-0121	.90	3.3 E-3
Spinach	83-0125	.006	83-0121	.90	6.7 E-3
Tomato leaves	83-0127	.0054	83-0121	.90	6.0 E-3
Tomato	83-0131	<.002	83-0132	.39	5.1 E-1
Tomato	83-0137	.032	83-0136	.21	1.5 E-1
Tomato	83-0191	0.006	83-0189	10	6.0 E-4
Tomatoes	83-0288	0.015	83-0286	1.5	1.0 E-2
Zuccini	83-0128	.005	83-0121	.90	5.5 E-3
Squash	83-0289	0.007	83-0286	1.5	4.7 E-3
Kroger Veg.	83-0145	.004	———	——	———
Rose Hips	83-0177	.022	83-0179	440	5.0 E-5
River Cane	83-0178	.02	83-0179	440	4.5 E-5
Blackberry	83-0180	<0.002	83-0181	81	2.5 E-5
Blackberry	83-0185	<0.002	83-0186	36	5.5 E-5
Water Cress	83-0187	0.024	83-0188	37	6.5 E-4
Corn Plant	83-0255	0.31	83-0253	2.3	1.3 E-1
Mint Plant	83-0324	0.16	83-0325	29	5.5 E-3

RJC:ph
August 17, 1983

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT
Bureau of Environment
T.E.R.R.A. BUILDING
150 NINTH AVENUE, NORTH
NASHVILLE, TENNESSEE 37203

August 31, 1983

Ms. Debbie Martin
Room B-374
Rayburn House Office Building
Washington, D. C. 20515

Dear Ms. Martin:

Enclosed are the supplemental questions and answers to be added to my testimony concerning conditions at the Oak Ridge Complex. I hope these clarify some of my previous statements.

If I can be of further assistance, please let me know.

Sincerely,

M T Bruner

Michael T. Bruner, Dr. P.H.
Assistant Commissioner for Environment

MTB/SWH/tg 3/1

Enclosure

Additional Questions for
Dr. Michael T. Bruner

1. Upon what do you base your statement that the scientific capability at Oak Ridge for assessing environmental problems in terms of public health and safety has "been ignored"?

2. Could you briefly summarize the State of Tennessee's position as regards its jurisdiction with respect to the mercury problem and the question of environmental compliance by the Department of Energy?

3. What is your understanding of the facilities and activities at the Oak Ridge National Laboratory with respect to their compliance with environmental requirements?

4. In the third paragraph of your statement you mention that "Federal facilities in Tennessee constitute some of the most significant and severe environmental problems in the state." Could you provide the subcommittees with a list of those facilities that you believe constitute these significant and severe environmental problems ranked in order of the severity of threat which they pose?

5. In the third paragraph of your statement you also mention that the Division of Water Management has conducted inspections and requested information of the Department of Energy. Was DOE cooperative with your requests for information and inspections?

6. You mention in your statement that there are "numerous instances of environmental degradation." Are these instances of serious concern and, if so, could you provide the subcommittees with a list of these instances and provide a quantitative basis for your concern? In the fourth paragraph of your statement you mention that mercury contamination poses a "major health and environmental concern." Is this mercury contamination now a threat to public health and safety?

7. Is there an ambient or natural level of mercury in the soil and water in this area? How high above this natural level are the mercury contamination levels caused by the operation of the Y-12 facility?

8. You mention in paragraph four of your statement that you feel that a "comprehensive assessment" of the environmental problems at the Complex is necessary. Has DOE, to your knowledge, made such an assessment? Have you made a request to DOE for a comprehensive assessment? Has DOE been cooperative in any such request?

9. You mentioned in paragraph five of your statement that, "withholding information...fails to fulfill DOE's responsibility to the people of Oak Ridge...". In your opinion, is DOE now withholding information from you on mercury contamination and other

pollutants at the Oak Ridge Complex?

*10. The yearly "Environmental Monitoring Reports" of the Oak Ridge facilities from 1976 to 1982, identified mercury levels in stream sediments, and in at least one case the mercury contamination level was as high as 154 micrograms per gram. Since these were publicly available reports, did you obtain, review, and comment on these reports in order to identify any pollution control problem? Do you believe such reports present a comprehensive picture of the situation as you now know it?

11. In a variety of correspondence with the Department of Energy we noted that the State seemed to be chiefly interested in flow data of undiluted effluent streams. It has been suggested that the most important factor is the actual concentration of pollutants in the streams where aquatic life feed or which serve as sources of drinking water. Do you agree? Some have suggested that the Industrial Ditch leg of the East Fork Poplar Creek owes its existence chiefly to runoff of 6 million gallons per day of Y-12 water, and they, therefore, question whether this stream is a state waterway. What is your reply? If you believe that either Tennessee or Federal law supports your position, please explain.

1. My statement was that environmental concerns and public health have been ignored. While public health and safety is our first concern, environmental degradation must not be overlooked. Since the implementation of the Water Quality Control Act of 1971, industries in the State of Tennessee have been required to be in compliance with effluent standards and proper disposal practices. These standards were established to protect the public health, the environment and secure the continuation of an ample clean water supply for the state. The fact that DOE has no approved wastewater disposal system and continuously discharges untreated waste into Tennessee streams, constitutes a disregard for environmental repercussions and public health.

2. The state Water Quality Control Act of 1971 states that the waters of Tennessee are the property of the state and are to be held in public trust for the use of the people of the state. The purpose of the act is to abate pollution, reclaim polluted waters and prevent future pollution. The waters of the East Fork Poplar Creek have been rendered unusable to the public according to the stream's classification due to the fact that DOE fails to comply with environmental regulations.

3. ORNL has a sewage treatment plant which has been out of compliance since December 1981. There are some chemicals discharged through the plant and even some radioactive waste entering the plant through leakage of transportation lines. The plant is unable to treat those problems. ORNL also has old solid waste disposal pits, trenches and burial grounds containing large volumes of radioactive and chemical waste which have contaminated the ground water and surface water. The fish and aquatic life in the White Oak Creek watershed, including White Oak Lake and Clinch River, also show contamination. In addition, the radioactive wastewater treatment facility and the hydrofracture facility are not permitted and are totally unregulated by either the state or EPA. Little is known about environmental conditions at these two facilities since they are self-regulated. However, we have just completed an inspection at ORNL and should be in a position to make more definitive calculations soon.

4. The statement "most significant and severe environmental problems in the State" relates primarily to types and quantities of wastes as reported by federal facilities. Sites were initially identified through CERCLA Section 103(c) notifications. Subsequent State requests resulted in more detailed information which reported general systems of disposal with waste types and quantities. In order to evaluate the environmental and/or potential public health impacts of these sites, specific information as to pathways of release are a necessity. Although substantial information is available concerning waste quantity and types, pathway information has not yet been developed by the facilities. Therefore, a ranking of federal facilities as to severity is premature. Yet the potential when related to waste type and quantity is certainly significant in terms of threat based on the information currently available and general knowledge of past disposal practices.

5. DOE now appears to be cooperative with our requests for information.

6. The numerous instances of environmental degradation at Y-12 include:

   A. Upper East Fork of Poplar Creek

Downstream to New Hope Pond there are numerous pipes discharging to the stream even where the stream is underground. These untreated discharges include rinse water from the main metal plating shop, lab drains, laundry waste, mop water, cooling water, residual mercury from past spills, coal pile runoff, and other identified discharges. There are 227 discharge pipes into Upper EFPC. None of these discharges have permits.

B. New Hope Pond

The discharge is covered by an NPDES Permit which expired February 15, 1980. The permit parameters do not include all pollutants discharged in the sediments, such as mercury, uranium, thorium, and PCB's. The expired NPDES permit allows for the dilution of aqueous pollutants into EFPC. The discharge of contaminated sediments is the major environmental concern. One ORNL study (Preliminary Aquatic Survey of East Fork Poplar Creek and Bear Creek, 1974) shows high levels of mercury, uranium, thorium, and PCB's in New Hope pond sediments as well as in sediments in EFPC as it runs through the City of Oak Ridge to its confluence with Poplar Creek (West Fork). For example, data in the study shows one sediment sample taken from EFPC in the City of Oak Ridge as having the following concentrations: uranium - 1005.99 ppm., thorium - 171.4 ppm, and mercury - 18.0 ppm, as compared with expected background concentrations based on average earthcrust concentrations: uranium -4 ppm, thorium -12 ppm, and mercury - 0.5 ppm. This same study also showed one sediment with a concentration of PCB's of 6.0 ppm. The average of several samples taken from the sludge of New Hope Pond showed a concentration of PCB's of 54 ppm. Another ORNL study (Mercury Contamination Poplar Creek and the Clinch River, June 6, 1977) shows serious mercury contamination of New Hope Pond, EFPC, and fish in EFPC. A follow-up study (Mercury Contamination in East Fork Poplar Creek and Bear Creek, September 7, 1982) stated, "Mercury concentrations at all stations on EFPC exceeded background by a factor of 60 or more.", and "87% of the bluegill collected at the three upstream locations exceeded the Food and Drug Administration (FDA) action level for mercury." This study also showed mercury concentrations in pond sediments to be as high as 302 ppm. Flood plain and bank samples 1.0 mile downstream of New Hope Pond document mercury in excess of 450.0 ppm.

C. New Hope Sludge Disposal Area

This area is a modified depression on top of Chestnut Ridge. In the past, sediments from New Hope Pond have been dredged and placed in this area. Materials placed in this area are reported to contain as much as 1,100 ppm mercury, 900 ppm uranium, and 25 ppm PCB as well as other parameters. The site has never been approved for such disposal of hazardous material.

D. S-3 Ponds

This disposal area consists of 4 connected unlined ponds of approximately one acre each. The ponds have no discharge outlet, but are known to leak badly into the headwaters of Bear Creek. Available data indicates that waste disposed of into the ponds consists of plating sludges, plating solutions, nitric acid, hydrochloric acid, stripping and cleaning solutions, HF acid, mop water (containing uranium, beryllium, and thorium), halogenated solvents, nonhalogenated solvents, as well as other waste. This disposal area has caused severe pollution of the upper portion of Bear Creek where existing data indicates the stream to be devoid of aquatic life.

E. Burial Ground Oil Pond

This pond, built in 1968, dams up a small tributary to Bear Creek which runs through the burial grounds. The pond is covered with a heavy oil layer consisting of high concentrations of PCB and probably other chemicals (such as solvents). The area uphill from the ponds has been used for disposal of solid and liquid wastes for a number of years including the PCB/oil trench area. In 1968, it was noted that oily wastes were seeping out of the hillside below the trenches and entering the tributary, and thus the pond was built. Oily wastes are oozing out of the ground all along the valley below the trench area, and entering the tributary. The floor of the tributary valley is black with oil. A sample taken of oil from the edge of the pond showed 906.5 ppm PCB.

F. Isolation Area

This area is no longer in use, but until October 1981 was used for disposal of solvents and other chemical wastes (including cyanide). Disposal consisted of "evaporated pits" and "Stand Pipes" (shallow wells). Available ground water data showed concentration of perchloroethelyene of 23,199.5 ppm in the ground water down hill from this area. Other elevated chemical concentrations were also noted.

G. Disposal Pits

Ground water about three (3) feet deep can be seen standing in the bottom of the pits which contain contaminated solid waste. The west pit area was previously used for disposal of enriched uranium waste; however, now such waste is placed in both pit areas. Daily covering of the waste is not practiced at these areas.

H. Oil Land Farm

This is a plowed field in Bear Creek Valley where oils containing little or no PCB are plowed into the ground. The oils do, however, contain uranium and perhaps other contaminants. During wet weather, surface water runs off this area into a small spring fed tributary to Bear Creek. Available ground water data from wells located downhill from this area show elevated levels of solvents, especially perchloroethelyene.

Mercury contamination of the magnitude found at Oak Ridge is essentially an unknown factor. There are no past experiences or scientific studies to draw a conclusion from in regard to long term health and environmental effects. There appears to be no imminent health threats from the mercury released at Oak Ridge, but, as an unnatural unknown factor, it should remain a major concern.

7. There are no legal standards which establish an ambient level of mercury in soil. A study by H.T. Schacklette in 1971 indicates he determined .01-3.4 parts per million to be background levels for the Eastern United States. Levels in Oak Ridge in excess of 450 parts per million have been detected in soil. In water the Tennessee standard for mercury in drinking water is .002 ppm. The EPA Water Quality Criteria to protect fish and aquatic life is .00005 ppm. A study prepared by ORNL in 1977 showed mercury in East Fork Poplar Creek exceeding suggested levels by 60 times.

8. The department recently learned of a ten volume draft document that was prepared in 1975 and is an assessment of all three DOE facilities in Oak Ridge. We requested a copy of this document the last week of July and received it the second week of August. It is being reviewed by our staff.

9. I feel that we are witnessing a new day of cooperation with DOE under the leadership of Joe LaGrone. I am not aware of DOE withholding any additional information at this time.

10. Copies of the "Environmental Monitoring Reports" have been obtained within the last six months. We did not receive copies of these publications prior to this time but are now on the mailing lists. A review by the technical staff concludes that for our purposes these reports are too generalized and offer inadequate and could be misleading since the information often deals in averages and no specific numbers.

11. Concentrations of pollutants in streams is a critical factor in protecting all classifications of a stream and the only way to accurately control these concentrations is to strictly regulate the undiluted effluents being discharged into a stream. A stream is to be protected according to its classification along its entire reach not only in accordance with property lines. DOE responded as required by the MOU with a report identifying spring water as a contributor of approximately 12 million gallons a month to the flow of East Fork Poplar Creek above New Hope Pond. In addition, the "Y-12 Environmental Assessment of December 1982" states that springs contributing to the flow of the industrial ditch originate on the northern slope of Chestnut Ridge. The Tennessee Water Quality Control Act 70-326, paragraph CC, clearly supports the department's position that the headwaters of East Fork Poplar Creek are indeed waters of the state.

SH/ns/Rept./D-4

In September 1982, the Tennessee Division of Waste Management (DWM) requested DOE to attend a Compliance Review meeting on October 26, 1982, to discuss Mercury (Hq) contamination of the Oak Ridge area streams. Annual Monitoring Reports indicated contamination, but data was inconclusive since it had been presented in terms of averages. DOE was asked to bring all raw data concerning Hq to the meeting.

At the October 26 meeting, DOE presented the stack of papers, but placed special emphasis on the Oak Ridge National Laboratory (ORNL) report on Hq contamination of East Fork Poplar Creek (EFPC) and Bear Creek (BC) dated September 7, 1982. A cover report by Jerry Wing dated October 20, 1983 (?), had been prepared to explain this report. The ORNL report recommended, among other things, that state officials be notified of the findings of contamination, and that consideration be given to warning local fishermen of the fact that fish in EFPC had been found to contain Hq in excess of the FDA standard of 1.0 ppm. However, Wing, in his cover report, claimed no one fishes in EFPC, and if they did, chances are that they do not eat enough fish to cause a health problem, therefore, he recommended the stream not be posted. The stream was posted for Hq contamination on December 2, 1982, under strong protest by DOE.

At the October 26 meeting, DOE officials were asked to explain the origin of Hq in the waterways. Mr. Wing explained that in 1966, a valve had been left open in a building at Y-12, and approximately 100,000 pounds of Hq had spilled. About half of the spill was recovered and of the 50,000 pounds unrecovered, most was speculated to be trapped in the substructure of the building. That which did eventually escape to the waterway was believed to have been mostly trapped by New Hope Pond (NHP) with only a minimal amount released to the offsite environment. Thus, DOE officials contended, posting of the stream would cause undue concern over a nonexistent problem.

On December 22, 1982, DOE called DWM and asked that someone come to Oak Ridge to pick up some additional data on Hq coming out of NHP. Upon arrival, Mr. Wing and Mr. Gabe Marciante explained that Ed Slavin of the Appalachian Observer had filed a Freedom of Information (FOI) request for Hq data and that he would be given all the information DWM had received in October, plus the additional report entitled "Historic Hq Data 1954-1982". When asked why this information had not been delivered previously, DWM was told that it had not been specifically requested, but now that a reporter would be getting the information, DOE wanted the state to have it first.

The report gave figures for each month for Hq concentration in water from Y-12, X-10, and K-25. No individual samples or details on methodology were given. Monthly figures only were provided in this report. An examination of the data showed values as high as 14.1 ppm Hq in 1958 (as compared to the then existing standard of 0.05 ppm) leaving Y-12 via EFPC. This reading was taken downstream of the entire plant, after considrable dilution. This and other extremely high values indicated that a significant amount of Hq had been released to the offsite environment long before the 1966 spill. Apparently, the 1966 spill was only a small part of the story. It was learned later (in June 1983) that some Hq/water samples had been filtered before analysis, thereby possibly reducing the Hq concentration in the results by a significant amount. This could explain the relatively low Hq readings in 1966 and later years. It must now be determined which data is from filtered and which is from unfiltered samples to better assess the past and present level of Hq releases.

When it was found that Hq in concentrations of up to 480 ppm existed in the EFPC area near a development project, DOE presented EP toxicity data showing little or no leachability. Thus, it was contended, the material was not hazardous according to RCRA. However, Hq is a "listed" waste which means that, according to RCRA, any spilled Hq is a hazardous material and the EP toxicity test does not apply. Data submitted to EPA regarding this site only gave EP toxicity values, not concentrations. This problem of data interpretation with regard to RCRA continues.

In February 1983, DWM conducted a Compliance Evaluation Inspection (CEI) of Y-12. Having noted the 1958 Hq values and the data inconsistency, DOE officials were asked to provide DWM with a full report of Hq releases. It was explained that the report was classified; however, it was currently under review for declassification and when (and if) available, DWM would be given a copy. Also, based on the disposal practices observed during the CEI and the likelihood of severe groundwater contamination, all available data on groundwater in the DOE reservation was requested.

In May 1983, it was learned that in 1977, an inventory of Hq losses had been prepared as a classified document, estimating that 2.4 million pounds of Hq had been lost. If this estimate was based partly on the filtered Hq/water samples, then the actual amount may have been much greater.

Of major importance is the mercury (and other pollutant) releases resulting from storm water flows. Most sediment contaminants such as Hq are transported offsite mainly during high flow conditions when settled material is resuspended. The NHP flow monitoring station will measure flows only up to about 13 million gallons per day (MGD).

During heavy storm events, when most sediment/contaminant transport occurs, flows exceed the measuring device, and thus, inaccurate readings are made. Also, samples are taken on a grab, rather than a flow proportional composite basis, and thus another factor of inaccuracy is introduced. In order to properly assess pollutant releases, all flows must be measured along with composite sampling of both the water and suspended sediments. The method of monitoring used by DOE to date has probably underestimated the Hq releases, particularly with regard to storm events.

After the CEI, an inquiry was made as to the status of the groundwater report. It was learned that DWM would only be given data from deep wells. The shallower waters were not considered by DOE to be groundwater. A written request was then made by DWM for all groundwater data, deep and shallow. This data was received soon after, and showed relatively high concentrations of pollutants including Hq, U, Th, Cd, Be, PCB, and perchloroethylene. It is still unclear as to the sampling techniques and whether or not the samples were filtered. If the volatile organics; i.e. perchloroethylene, etc., were not sampled with proper methods (free of an air layer in the container) some of the material could escape before analysis and yield an artificially low reading. The data does, however, indicate serious pollution of groundwater in the Y-12 area. We did not search the area for private wells until public attention developed. This should have been done and the problem reported to the state when initial data showed groundwater contamination.

In a recent interview, DOE officials stated that groundwater contamination is not a problem since the water is not used. In a May 31, 1983, submittal, however, DWM learned that as much as 12 million gallons per month of groundwater is released from Y-12 to surface water. Present disposal practices, especially the S-3 ponds and the burial ground disposal pits, continue to add pollutants directly into the groundwater.

Over the past several years, a major point of disagreement between DOE and DWM is the need for individual discharge permits for flows from Y-12 to upper EFPC (above NHP). Until recently, DOE has maintained that this stretch of EFPC is simply an "industrial ditch", essentially an open pipe, and that all permit concerns should be with the end of the pipe, i.e., the outfall from NHP.

During a visit to Y-12, it was learned that EFPC at one time meandered through the present plant site, and was relocated in the present ditch configuration to make room for the buildings. In fact, the December 1982 Y-12 Environmental Assessment Report published by DOE states that EFPC originates from springs located on the northwest slopes of Chestnut Ridge near the vicinity of the Y-12 coal pile. As a stream, EFPC in its entirety is "waters of the state" as described in the Tennessee Water Quality Control Act and all discharges in these waters must have a permit.

In 1981, when this issue was being debated for permit renewal, DOE embarked upon a sampling program to show that it was unnecessary to permit each pipe. Grab (as opposed to flow proportional/composite) samples were taken from pipes with flows. Many of the pipes contain combined flows, i.e., uncontaminated cooling water, etc. Thus, due to this dilution effect, these catch samples might not accurately reflect the levels of contamination. Also, without flow data, concentration values do not give pollutant loadings (i.e., pounds per day). In total, an estimated 6 million gallon/day of potable water are added in the form of cooling water, etc., to the effluents to EFPC. It is also unclear whether the samples were from continuous flow or batch dump processes, or if the samples were filtered. No data on sediment was given.

From this report, DOE concluded that it was unnecessary to obtain permits for the pipes, and that the NHP monitoring station was sufficient. DWM has maintained that the NHP station is inadequate because it allows pollutants to be hidden (sometimes below detection level) by dilluting. Thus, although actual loadings (pounds per day) of pollutants may be quite high, the concentration values may be rather low. Permits written by DWM for other discharges always contain both concentration and loading limitations to prevent the masking of pollutants by dilution. However, the DOE permits only have concentration limits. Also, many of the pollutants are found in the sediments, not the water, by the time the flows exit NHP; however, no sediment monitoring has been requested.

Recently the DOE waste issues have received much public attention. In order to better inform the public, DOE has been independently gathering and releasing data without concurrence by DWM. Examples are: 1) Recently released Hq/water data from EFPC showing relatively low concentrations. It appears that these samples may have been filtered. 2) Soil samples from the sewer line ditch in front of Jefferson Junior High School, showing relatively low Hq values. DOE released the data, only later to learn that they had sampled the wrong location, missing the contaminated soil area by about three feet. 3) Data on Hq contamination of turtle meat and beef raised in the EFPC flood plain was released showing very low, if any, concentrations of Hq. Methodology of analyses is unknown; however, the report is believed to be based on one cow and one turtle. The ORNL September 1982 report, which alerted DWM to the Hq in fish; however, estimated that cattle grazing along EFPC could be expected to contain Hq in excess of 1.0 ppm and needed further study.

Recently a 12 inch water line broke in Y-12 nearing the area of Hq contamination and flushed Hq to EFPC. Samples of water leaving NHP were collected and analyzed for Hq content, perhaps filtered before analysis. DOE issued a press release stating that water with Hq in concentrations of up to 50 times the state limit had been discharged. The data and facts were not cleared with DWM before public release. In actuality, DOE used the wrong standard for comparison (their maximum discharge value being closer to 1,980 times the state standard for protection of fish and aquatic life) and the samples, perhaps filtered, were taken, not of EFPC in the area of the spill, but after NHP and all the dilution water and settling time. Such public presentation of data without DWM review can give an inaccurate view of the situations to the public.

The most obvious example of inaccurate information being released to the public is the Y-12 1982 Environmental Assessment. This report states, on page __, among other things, that "Y-12 complies with all state and federal laws and regulations." It also states throughout that environmental problems at Y-12 are minimal or nonexistent. This report was not given any form of outside review prior to release and gives the public a one-sided, "no-problem" view of what the state considers to be a very serious environmental contamination problem. If a report such as this were in the form of an Environmental Impact Statement, then perhaps a more balanced assessment could result.

It appears that DOE has been aware of environmental problems for some time; however, disposal methods have not been changed accordingly. Data reported to the state generally showed no problems. However, data on things such as PCB seepage from the burial grounds and the discharge of the resulting pond, data on seepage from the S-3 ponds and the nearby portion of Bear Creek water and sediments, groundwater data showing contamination from the waste disposal areas, and data showing fish in EFPC exceeding the FDA standard were generally never offered. This type of information came to the state because of information requests. The Notice of Noncompliance issued by DWM following the February 1983 CEI instructed DOE to stop using unauthorized disposal methods. Such methods are still in use, and environmental contamination continues to occur.

ADM:pg 4/1

TENNESSEE DEPARTMENT OF PUBLIC HEALTH

OFFICE CORRESPONDENCE

FROM	TO	DATE

DATE: November 17, 1982

TO: D.O.E. File

FROM: Barry Sulkin

SUBJECT: EPA Visit - K-25, X-10, Y-12
November 8, 9, 10, 1982
Oak Ridge, Anderson County

Bill Rowe, EPA Atlanta, Federal Facilities Permit Section, visited the three Oak Ridge plants in preparation for writing the new NPDES Permits. Mike Travaglini, D.O.E., invited me to accompany him on the tours. Bill Rowe has been working in EPA's Hazardous Waste Section and as a result of the most recent reorganization was moved into the Fed-Facil program. He alone is now in charge of writing all Fed permits for all of Region IV except two states that now have the designation to write their own. He's been on the job six months and has not yet issued any permits. There is a very large backlog.

Bill's visit to D.O.E. was scheduled as follows:

November 8 - Briefing; visit of K-25 (ORGDP), pm
November 9 - Visit of X-10 (ORNL) am; visit of Y-12, pm
November 10 - Debriefing, am

At the briefing on November 8, Bill discussed the status of the D.O.E. permits and the purpose of his visit. The permits all expired about two years ago and due to disagreements over changes and due to EPA's reorganizations new permits were never issued. Therefore, D.O.E. is currently operating under the limits of the old permits. Bill also explained that he knew almost nothing about the D.O.E. plants, was totally neutral on any issues and was making the visit to learn enough to begin working on the permits. He also mentioned that he was aware of some "new data" collected in December, 1981, from the Y-12 discharges to the creek above New Hope Pond but had not yet reviewed the information. Mr. Wing explained that this data cost over $100,000 and showed no problem.

FROM	DATE
BWS	11-29
TO	
KDC	
ECL	
[illegible]	[illegible]
ADM	

The tour groups of the plant contained Jerry Wing, Mike Travaglini, Bill Rowe, Barry Sulkin and the environmental personnel from each facility we were visiting.

Most significant problems are as follows:

K-25

1. Decontamination water joins coal pile run-off and is discharged from the 901a pond. Permit has no metal limits besides total chromium and no lbs. limits.

Permit needs uranium and perhaps other metals or parameters of significance in decontamination operation.

Permit needs lbs. limits to prevent compliance by dilution.

There may be a rad problem here with decontamination waste.

Sediments in 901a pond may be a problem. Currently there is no monitoring or permit limits for sediments.

X-10

1. Some problem with lab drains, but most lab waste is collected and sent off-site for disposal (i.e. to Chem Waste in Alabama).

2. STP severely overloaded due to I/I. Total solids wash out. No solids collected for years. Constant ammonia violations. Some BOD and solids violations. No sludge banks in receiving stream noted.

3. Process waste (radioactive) is discharged to White Oak Lake. No permit on this discharge. Perhaps needs limits for rad and/or uranium. Biggest problem is probably with sediments.

4. Leachate from burial grounds is probably a major problem. They have shallow wells to monitor for leachate, but Mr. Wing does not want to give us that data.

5. There is much dillution before monitoring points.

Y-12

1. There was a stream before Y-12 (acc to Mr. Napier) that was replaced by the industrial ditch.

2. There is no treatment of waste to New Hope, only dillution and settlings. "New data" was diluted before sampling, not data from process waste. [illegible]

3. New Hope permit has concentration only, no lbs., thus allowing them to dillute to meet limits.

4. No uranium limits on permit.

5. Approximately 6 mgd of potable water is added to the industrial ditch and thus dilutes waste.

6. Sediments [illegible] main problem in New Hope (esp. Hg and possibly PCB and uranium).

7. All serious waste is trucked to S-3 ponds.

8. S-3 ponds have pH of 1.5 (3 ea.) and one has pH of 4.0.

9. S-3 ponds get all plating waste and leak badly.

10. No permit on S-3 ponds. Only Bear Creek monitoring point 5 miles downstream.

11. Probably severe problem from burial grounds in Bear Valley d/s from S-3. Esp. PCB and cutting oils with degreasers.

B. W. S.

BWS/kav C/I

COMPLIANCE EVALUATION INSPECTION

OAK RIDGE Y-12 FACILITY

MARCH, 1983

DIVISION OF WATER MANAGEMENT
TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT
KNOXVILLE BASIN OFFICE

Persons Present:

Merwin Sanders, Environmental Coordinator, Y-12

Paula Pritz, Environmental Section, Y-12

George Camp, Environmental Section, Y-12

Jim Bailey, Disposal Coordinator, Y-12

Lester Heidel, Environmental Surveillance, Y-12

Mike Travaglini, Environmental Engineer,D.O.E.

Chris Bird, Environmental Engineer, D.O.E.

David McKinney, Tennessee Division of Water Management

Barry Sulkin, Tennessee Division of Water Management

On February 23, 1983, an inspection of the Y-12 Plant was conducted. A copy of the report form is enclosed. The inspection revealed major environmental pollution problems and violations of the Tennessee Water Quality Control Act (the Act). Specific items of concern and corrective measures to be taken are outlined as follows:

1. Upper East Fork of Poplar Creek (EFPC)(upstream of New Hope Pond - also known as "industrial ditch") - As described on page III - 26 of the 1982 Y-12 Environmental Assessment, this stream originates on the northwestern slopes of Chestnut Ridge (near the coal pile). In accordance with the Definition of "Waters" of the Act (section 70-326cc), this stretch of the stream is considered "waters of Tennessee" and thus subject to the law. The upper

reaches of the stream are underground and emerge into what is sometimes called the "industrial ditch" by D.O.E. and Y-12 personnel. From this point downstream to New Hope Pond there are numerous pipes discharging to the stream. Where the stream is underground, there are also numerous discharges. These untreated discharges include rinse water from the main metal plating shop, lab drains, laundry waste, mop water, cooling water, residual mercury from past spills, coal pile runoff, and other identified discharges. During our visit, we observed the stream at the point where it emerges from underground through a large pipe. The stream contained a significant solids burden and available information and observations indicate this stream segment to be devoid of aquatic life. A large pipe on the north shore was discharging, and as we watched, the flow characteristics including volume, color, and odor changed significantly, indicating a batch discharge. This discharge was sampled and identified as "building 9995 drain". All discharges into waters of the State must be under a permit. There are perhaps 50 to 100 discharge pipes into Upper EFPC. None of these discharges have permits.

D.O.E. should submit to the State, characteristion of all wasteflows to Upper EFPC along with proposals for treatment and monitoring before dilution. Also, there is a need to determine if all chemical storage facilities in the Upper EFPC Y-12 watershed have proper protection to prevent spills from reaching the stream. Correction of the coal pile run-off needs to be addressed. Recently, a letter was sent to EPA stating that available waste stream data is not adequate to determine permit needs (See Attachment).

2. New Hope Pond - This was built in 1963, impounds EFPC near the Y-12 boundary. The discharge is covered by NPDES Permit TND002968 (which expired February 15, 1980.) Approximately six (6) million gallons per day of dilution water are discharged to EFPC before it enters the pond. All discharge parameters are measured after dilution and in concentration only. The permit does not limit pollutants in terms of loading (pounds per day) and thus by design, allows dilution in order to meet limits. This is an unusual permit situation, since in private industry, individual process discharges are treated and monitored for concentration and loading, and dilution is not allowed as a

treatment technique. The permit parameters do not include all pollutants discharged, nor does it cover any pollutants discharged in the sediments, such as Mercury, uranium, thorium, and PCB's. Aside from the dilution of aqueous pollutants, the discharge of contaminated sediments is the major environmental concern.

Information recently obtained from D.O.E. regarding studies by scientists at the Oak Ridge National Laboratory (ORNL) reveals serious sediment contamination in New Hope Pond and EFPC downstream of the pond. One study (Preliminary Aquatic Survey of East Fork Poplar Creek and Bear Creek, 1974). shows high levels of mercury, uranium, thorium, and PCB's in New Hope Pond sediments as well as in sediments in EFPC as it runs through the City of Oak Ridge to its confluence with Poplar Creek (West Fork). For example, data in the study shows one sediment sample taken from EFPC in the City of Oak Ridge as having the following concentrations: uranium - 1005.99 ppm, thorium - 171.4 ppm, and mercury - 18.0 ppm, as compared with expected background concentrations based on average earthcrust concentrations:

uranium - 4 ppm, thorium - 12 ppm, and mercury - 0.5 ppm. This same study also showed one sediment (taken just downstream of the previously referenced sample) with a concentration of PCB's of 6.0 ppm. The average of several samples taken from the sludge of New Hope Pond showed a concentration of PCB's of 54 ppm.

Another ORNL study (Mercury Contamination Poplar Creek and the Clinch River, June 6, 1977) shows serious mercury contamination of New Hope Pond, EFPC, and fish in EFPC. This study states, "The East Fork of Poplar Creek, Poplar Creek, and the Clinch River below the mouth of Poplar Creek were found to be contaminated with mercury based on analyses and comparisons of Hg concentrations in fish and sediments collected from the environs." A follow-up study (Mercury Contamination in East Fork Poplar Creek and Bear Creek, September 7, 1982) stated, "Mercury concentrations at all stations on EFPC exceeded background by a factor of 60 or more.", and "Although there was a decrease in concentration with distance downstream, mercury concentration in 87% of the bluegill collected at the three upstream locations exceeded the Food and Drug Administration (FDA) action level for mercury in the edible portion of fish of 1.0 ug/g fresh weight." This study also showed mercury concentrations in pond sediments to be as high as 302 ppm. Flood plain and bank samples 1.0 miles downstream of New Hope Pond document mercury in excess of 450.0 ppm.

On December 22, 1982, D.O.E. submitted to this office a report titled "Historic Mercury in Effluents Data". This report shows that between 1954 and 1982 there were unpermitted discharges of mercury in excess of what is noted in the report as the Tennessee Guideline of 0.005 mg/l. The most significant discharges occurred in the early years with an average monthly concentration of mercury running as high as 14.5 mg/l (2,900 times the Guideline). These discharges were not reported to this Division.

During our visit, it was mentioned that there exists a full report of mercury losses at Y-12. This report should be obtained for our review as soon as possible. The New Hope Pond NPDES permit should be modified to cover all parameters (including sediment contaminants) that may be discharged. The permit should cover both concentration and loading. A proposal to clean out the contaminated sediments in this pond is needed immediately.

3. New Hope Sludge Disposal Area - This area lies on top of Chestnut Ridge above New Hope Pond. It is a modified depression with no apparent surface discharge point. In the past, sediments from New Hope Pond have been dredged and placed in this area. The last major dredging took place in the spring of 1973. Material placed in this area reported contains as much as 1,100 ppm mercury, 900 ppm uranium, and 25 ppm PCB as well as other parameters. There is presently one monitoring well located in the area and more wells are planned.

The material placed in this area may likely be hazardous material; however, the site has never been approved for such disposal. Additional monitoring of groundwater (both on the Clinch River and EFPC slopes) is needed. An investigation into the suitability of the site is needed before additional material is placed there. After a full assessment of the suitability of this site for disposal of hazarous materials, technical judgments concerning the fate of previously deposited materials can be made.

4. S-3 Ponds - This disposal area consists of 4 connected ponds of approximately one acre each. The southeast pond has a pH of about 2.5 while the other three have a pH of between 1.0 and 1.5. The ponds are unlined and consists of earth dikes. Approximately 1.5 million gallons per year of waste is put into the ponds. The ponds have no discharge outlet, but are known to leak badly into the headwaters of Bear Creek. The leakage can be seen coming through the south east corner of the pond wall and a thick white deposit covers the bottom of the stream for some distance. Samples of Bear Creek were taken above and below the ponds as well as of the leakage. Available data indicates that waste put into the ponds consists of plating sludges, plating solutions, nitric acid, hydrochloric acid, stripping and cleaning solutions, HF acid, mop water (containing uranium, beryllium, and thorium), halogenated solvents, non-halogenated solvents, as well as other waste. Most of the waste receives no

treatment and is eventually either evaporated or leaked to Bear Creek. This disposal area has no discharge permit, however, there is an NPDES permit location approximately five (5) miles downstream. This permit only contains discharge limits for oil and grease (concentration only) and pH. This disposal area has caused severe pollution of the upper portion of Bear Creek where existing data indicates the stream to be devoid of aquatic life. Bear Creek from its origin to it confluence with EFPC is classified for fish and aquatic life.

Discharges to the S-3 ponds result in illegal discharges to the waters of the State. A plan for the elimination of the discharges and the closure of the ponds should be submitted. Immediate efforts should be made to stop further leakage until a final solution to the problem can be achieved. Y-12 personnel indicated that pH adjustment could allow precipitation and help reduce the leaking.

5. Burial Ground Oil Pond - This pond, built in 1968, dams up a small tributary to Bear Creek (near the county line) which runs through the burial grounds. The

tributary is considered waters of the State. The pond is covered with a heavy oil layer consisting of high concentrations of PCB and probably other chemicals (such as solvents). The area uphill from the pond has been used for disposal of solid and liquid wastes for a number of years. Some disposal still takes place. One former disposal area in this watershed is the PCB/oil trench area. Trenches were dug twenty (20) feet deep and one hundred (100) feet long. Oils consisting of PCB and solvents were poured into the trenches for disposal until 1973. Non PCB waste oils and coolants were disposed in the trench until 1978 when the trench disposal practice was discontinued. In 1968, it was noted that oily wastes were seeping out of the hillside below the trenches and entering the tributary, and thus the pond was built. The pond has a floating boom across the middle and a submerged (inverted siphon) outlet with a constant discharge. During our visit, the oily wastes could be seen oozing out of the ground all along the valley below the trench area, and entering the tributary. The floor of the tributary valley was black with oil. A sample taken of oil from the edge of the pond showed 906.5 ppm PCB.

The pond is a treatment unit with a continuous point source discharge. There is no permit for this discharge. D.O.E. should submit a permit application. Also, the impounded tributary being used to contain the seeps is water of the State. Until the discharge can be stopped, a permit is needed. A proposal to prevent the seepage from entering the tributary and ultimately correct the problem is needed. Additional sampling of this area will be conducted in the near future. D.O.E. should submit a chronology of events involved with disposal of waste in this watershed (especially with respect to PCB), the construction of the pond. and disposal practices and corrective measures since that time including waste characteristics of all waste placed in this area (such as oils, pesticides, solvents, metals, etc.) and existing monitoring data. In addition, discharge from the pond should be characterized as to concentration and mass loading of COD, BOD_5, solids, volatile organics, TOC and bacteria.

6. Isolation Area - This area is no longer in use, but until October, 1981, was used for disposal of solvents and other chemical wastes (including cyanide). Waste

from this area likely seeps towards the oil pond. Disposal consisted of "evaporated pits" and "Stand Pipes" (shallow wells). Available groundwater data showed concentration of perchloroethelyene of 23,199.5 ppb in the groundwater down hill from this area. Other elevated chemical concentrations were also noted. This area needs to be studied to determine if corrective measures can be taken to reduce or control groundwater pollution. A proposal from D.O.E. is needed.

7. Disposal Pits - There are two "pit" areas in the watershed above the oil pond. Clearing of timber for additional pits was underway during our visit. The active pits, now in use, consists of open holes about 20 feet deep, 20 feet wide and lengths of perhaps 30 to 50 yards. Groundwater about three (3) feet deep can be seen standing in the bottom of the pits. Contaminated solid waste is dumped into the pits and allowed to sit in the water. Metal scraps, (including uranium) barrels, electrical equipment, and other assorted waste could be seen in and near the pits. One pit area is located to the east of the oil pond (downhill from the above described oil trenches) and the other pit area is

located to the west of the oil pond. The west pit area was previously used for disposal of enriched uranium waste; however, now such waste is placed in both areas. Near the main west pit, uranium chips are buried. Daily covering of the waste is not practiced at these areas.

Groundwater is waters of the State, and the dumping of waste into such waters is a violation of the Act. A Best Management Plan to prevent groundwater infiltration through disposal areas is to be submitted by D.O.E. Available groundwater data must be studied to determine the extent of existing contamination and to determine what corrective action can be taken. A proposal from D.O.E. is needed.

8. Oil Land Farm - This is a plowed field in Bear Creek Valley near the burial grounds. Oils containing little or no PCB are plowed into this area. The oils do, however, contain uranium and perhaps other contaminants. During wet weather, surface water runs off this area into a small spring fed tributary to

Bear Creek. There is a marsh area located in the middle of the plot and water was flowing from area at the time of our visit. There is no discharge permit for this disposal operation. Available groundwater data from wells located downhill from this area show elevated levels of solvents, especially perchloroethlyene.

Disposal in this area must be stopped until it can be determined if such activity is causing pollution of surface or groundwater. A listing of material disposed of at this site and a suitability study is needed. Also, a management plan for preventing material from entering waters of the State as well as spill control measures and a monitoring program is needed. There is currently no permit for this area, however one is needed. A permit application should be submitted by D.O.E.

(Information contained in this report was obtained from documents submitted by D.O.E., inspection observations, and information verbally provided during this inspection.)

BWS:pd 3/6

STATE OF TENNESSEE
DEPARTMENT OF PUBLIC HEALTH
EAST TENNESSEE REGIONAL OFFICE
ALEX B. SHIPLEY REGIONAL HEALTH CENTER
1522 CHEROKEE TRAIL
KNOXVILLE, TENNESSEE 37920

March 8, 1983

CERTIFIED MAIL

Mr. Jerry F. Wing, Chief
Environmental Protection Branch
U. S. Department of Energy - Oak Ridge Operations
P. O. Box E
Oak Ridge, TN 37830

Re: NOTICE OF NON-COMPLIANCE
Y-12 Plant Compliance Evaluation Inspection
Anderson and Roane Counties, Tennessee

Dear Mr. Wing:

On February 23, 1983, a Compliance Evaluation Inspection of the Y-12 Plant was conducted. A copy of the report form and comments are attached. The inspection, along with review of documents recently submitted to this office, revealed serious environmental problems associated with present and past waste disposal practices at Y-12. Many of the problems constitute pollution of, and illegal discharges to, waters of the State and thus violations of the Tennessee Water Quality Act.

Executive Order 12088-Federal Compliance with Pollution Control Standards, requires Federal Facilities to comply with "applicable pollution standards" including state standards,"... that would apply to a private person." The Order also states (section 1-601) that upon notification of violation of standards, such as this correspondence, the Federal Facility shall promptly provide "a plan to achieve and maintain compliance".

The attached report will detail the various problems at Y-12. In general, all unauthorized discharges must be terminated. This includes the leaking of waste from the S-3 ponds to

Bear Creek and discharge of pollutants to groundwater resulting from the dumping of contaminated debris into the burial ground pits. A plan of action to temporarily contain wastes and permanently solve the problems is requested to be sent to this office no later than April 15, 1983.

With regard to surface and groundwater water contamination originating from trench and pit disposal areas, this office has been informed that the Division of Solid Waste Management is not recognized as having jurisdiction over disposal practices (other than sanitary) because of the radioactive waste exclusion in the State's hazardous materials regulations. D.O.E.'s contention is that all waste contains some radioactive material and is thus exempt. The exclusion of radioactive parameters for external solid waste regulation was designed to give D.O.E. internal control over classified materials. This exclusion was not, however, intended to provide for systematic circumvention of best management practices for preventing water quality degradation. The Tennessee Water Quality Act specifically covers radioactive pollution of surface and groundwater.

During the inspection, Y-12 personnel indicated that a report of all mercury releases was in the process of being declassified. If not already being sent, please provide this office with a copy as soon as possible.

In the Compliance Sampling Inspection report of November 18-20, 1980, it was requested that information regarding identity and characterization of "all sources of contamination (Point and Non-Point) in Bear Creek and its tributaries," be submitted to this office within thirty (30) days. This information was never received. It is again requested that this information be submitted. Also, please supply this office with information regarding any other waste storage or disposal areas not visited on this inspection.

At the time of this inspection, we were asked not to take photographs, however, it was indicated that photographs could be provided of areas of concern. Please provide this office with slides and prints of the following areas:

1. Upper East Fork Poplar Creek (above New Hope Pond) showing discharge pipes
2. New Hope Pond
3. New Hope sediment disposal area
4. S-3 ponds showing the ponds, leakage, and Bear Creek where pond material is collecting
5. Oil land farm
6. PCB/Oil catchment pond in the burial grounds showing pond, discharge, and seeps in the watershed above the pond
7. PCB trench area
8. Disposal pits showing waste in standing groundwater (both pit areas)
9. The standpipe and chemical pit disposal areas

The cooperation shown by D.O.E. and Y-12 personnel during our visit is appreciated. Hopefully we can cooperate to expeditiously begin work to resolve the matters of concern.

Sincerely,

Aubrey D. McKinney

Aubrey D. McKinney
Assistant Basin Manager
Division of Water Management

ADM:pd 3/6

Form Approved
OMB No. [illegible]

NPDES COMPLIANCE INSPECTION REPORT *(Coding Instructions on back of last page)*

ON		NPDES	YR MO DA	TYPE	INSPEC-TOR	FAC TYPE	TIME
5	5	TN0002968	830223	C	S	4	10:00 a.m. to 3:30 p.m.
1	2	3 – 11	12 – 17	18	19	20	

REMARKS

ADDITIONAL 4 Discharges covered by this permit
(1) Kerr Hollow Quarry (2) Rogers Quarry (3) New Hope Pond (4) Bear Creek

SECTION A - Permit Summary

NAME AND ADDRESS OF FACILITY *(Include County, State and ZIP code)*
Department of Energy - Oak Ridge Operations - Union Carbide Y-12 Plant
P.O. Box E
Oak Ridge, TN 37830

EXPIRATION DATE: Feb 15, 1980
ISSUANCE DATE: Feb 15, 1975

RESPONSIBLE OFFICIAL: Jerry Wing, DOE
TITLE: Chief, Envi Protection Branch
PHONE: 576-0845

FACILITY REPRESENTATIVE: Mervin Sanders, Y-12 Union Carbide
TITLE: Plant Envi Coord
PHONE: 574-3546

SECTION B - Effluent Characteristics *(Additional sheets attached ✓)* Forthcoming

PARAMETER/ OUTFALL		MINIMUM	AVERAGE	MAXIMUM	ADDITIONAL
	SAMPLE MEASUREMENT				
	PERMIT REQUIREMENT				
	SAMPLE MEASUREMENT				
	PERMIT REQUIREMENT				
	SAMPLE MEASUREMENT				
	PERMIT REQUIREMENT				
	SAMPLE MEASUREMENT				
	PERMIT REQUIREMENT				
	SAMPLE MEASUREMENT				
	PERMIT REQUIREMENT				

SECTION C - Facility Evaluation *(S = Satisfactory, U = Unsatisfactory, N/A = Not applicable)*

S	EFFLUENT WITHIN PERMIT REQUIREMENTS	U	OPERATION AND MAINTENANCE	U	SAMPLING PROCEDURES
S	RECORDS AND REPORTS	N/A	COMPLIANCE SCHEDULE	S	LABORATORY PRACTICES
U	PERMIT VERIFICATION	U	FLOW MEASUREMENTS		OTHER:

SECTION D - Comments

Unpermitted Discharges to Waters of the State

SECTION E - Inspection/Review

SIGNATURES	AGENCY	DATE
INSPECTED BY		
INSPECTED BY	TENN WTR Mgt	2-23-83
REVIEWED BY		

ENFORCEMENT DIVISION USE ONLY
COMPLIANCE STATUS
☐ COMPLIANCE
☐ NONCOMPLIANCE

EPA FORM 3560 3 (9 77)   REPLACES EPA FORM T-51 (9-76) WHICH IS OBSOLETE.   PAGE 1 OF 4

... Complete on all inspections, as appropriate. N/A = Not Applicable	PERMIT NO.

acility and Permit Background

PERMITTEE IF DIFFERENT FROM FACILITY ity, County and ZIP code)	DATE OF LAST PREVIOUS INVESTIGATION BY EPA/STATE 11-9-82 w/ Bill Rowe EPA Atlanta FINDINGS All areas toured on 2-23-83 not visited on 11-9-82, but similar findings

SECTION G - Records and Reports

RECORDS AND REPORTS MAINTAINED AS REQUIRED BY PERMIT. ☑ YES ☐ NO ☐ N/A *(Further explanation attached ______)*

DETAILS

(a) ADEQUATE RECORDS MAINTAINED OF:			
(i) SAMPLING DATE, TIME, EXACT LOCATION	☑ YES	☐ NO	☐ N/A
(ii) ANALYSES DATES, TIMES	☑ YES	☐ NO	☐ N/A
(iii) INDIVIDUAL PERFORMING ANALYSIS	☑ YES	☐ NO	☐ N/A
(iv) ANALYTICAL METHODS/TECHNIQUES USED	☑ YES	☐ NO	☐ N/A
(v) ANALYTICAL RESULTS *(e.g., consistent with self-monitoring report data)*	☑ YES	☐ NO	☐ N/A
(b) MONITORING RECORDS *(e.g., flow, pH, D.O., etc.)* MAINTAINED FOR A MINIMUM OF THREE YEARS INCLUDING ALL ORIGINAL STRIP CHART RECORDINGS *(e.g. continuous monitoring instrumentation, calibration and maintenance records).*	☑ YES	☐ NO	☐ N/A
(c) LAB EQUIPMENT CALIBRATION AND MAINTENANCE RECORDS KEPT.	☑ YES	☐ NO	☐ N/A
(d) FACILITY OPERATING RECORDS KEPT INCLUDING OPERATING LOGS FOR EACH TREATMENT UNIT.	☑ YES	☐ NO	☐ N/A
(e) QUALITY ASSURANCE RECORDS KEPT.	☑ YES	☐ NO	☐ N/A
(f) RECORDS MAINTAINED OF MAJOR CONTRIBUTING INDUSTRIES *(and their compliance status)* USING PUBLICLY OWNED TREATMENT WORKS.	☐ YES	☐ NO	☑ N/A

SECTION H - Permit Verification

INSPECTION OBSERVATIONS VERIFY THE PERMIT. ☑ YES ☐ NO ☐ N/A *(Further explanation attached ______)*

DETAILS

(a) CORRECT NAME AND MAILING ADDRESS OF PERMITTEE.	☑ YES	☐ NO	☐ N/A
(b) FACILITY IS AS DESCRIBED IN PERMIT.	☑ YES	☐ NO	☐ N/A
(c) PRINCIPAL PRODUCT(S) AND PRODUCTION RATES CONFORM WITH THOSE SET FORTH IN PERMIT APPLICATION.	☑ YES	☐ NO	☐ N/A
(d) TREATMENT PROCESSES ARE AS DESCRIBED IN PERMIT APPLICATION.	☑ YES	☐ NO	☐ N/A
(e) NOTIFICATION GIVEN TO EPA/STATE OF NEW, DIFFERENT OR INCREASED DISCHARGES.	☑ YES	☐ NO	☐ N/A
(f) ACCURATE RECORDS OF RAW WATER VOLUME MAINTAINED.	☑ YES	☐ NO	☐ N/A
(g) NUMBER AND LOCATION OF DISCHARGE POINTS ARE AS DESCRIBED IN PERMIT.	☐ YES	☑ NO	☐ N/A
(h) CORRECT NAME AND LOCATION OF RECEIVING WATERS.	☑ YES	☐ NO	☐ N/A
(i) ALL DISCHARGES ARE PERMITTED.	☐ YES	☑ NO	☐ N/A

SECTION I - Operation and Maintenance

TREATMENT FACILITY PROPERLY OPERATED AND MAINTAINED. ☐ YES ☑ NO ☐ N/A *(Further explanation attached ✓)*

DETAILS: SEE REPORT

(a) STANDBY POWER OR OTHER EQUIVALENT PROVISIONS PROVIDED.	☑ YES	☐ NO	☐ N/A
(b) ADEQUATE ALARM SYSTEM FOR POWER OR EQUIPMENT FAILURES AVAILABLE.	☑ YES	☐ NO	☐ N/A
(c) REPORTS ON ALTERNATE SOURCE OF POWER SENT TO EPA/STATE AS REQUIRED BY PERMIT.	☐ YES	☐ NO	☑ N/A
(d) SLUDGES AND SOLIDS ADEQUATELY DISPOSED.	☐ YES	☑ NO	☐ N/A
(e) ALL TREATMENT UNITS IN SERVICE. THERE ARE NONE OTHER THAN AERATION	☑ YES	☑ NO	☑ N/A ←
(f) CONSULTING ENGINEER RETAINED OR AVAILABLE FOR CONSULTATION ON OPERATION AND MAINTENANCE PROBLEMS.	☑ YES	☐ NO	☐ N/A
(g) QUALIFIED OPERATING STAFF PROVIDED.	☑ YES	☐ NO	☐ N/A
(h) ESTABLISHED PROCEDURES AVAILABLE FOR TRAINING NEW OPERATORS.	☑ YES	☐ NO	☐ N/A
(i) FILES MAINTAINED ON SPARE PARTS INVENTORY, MAJOR EQUIPMENT SPECIFICATIONS, AND PARTS AND EQUIPMENT SUPPLIERS.	☑ YES	☐ NO	☐ N/A
(j) INSTRUCTIONS FILES KEPT FOR OPERATION AND MAINTENANCE OF EACH ITEM OF MAJOR EQUIPMENT.	☐ YES	☐ NO	☑ N/A
(k) OPERATION AND MAINTENANCE MANUAL MAINTAINED.	☑ YES	☐ NO	☐ N/A
(l) SPCC PLAN AVAILABLE.	☑ YES	☐ NO	☐ N/A
(m) REGULATORY AGENCY NOTIFIED OF BY PASSING. *(Dates ______)*	☐ YES	☑ NO	☑ N/A
(n) ANY BY PASSING SINCE LAST INSPECTION. SEE PAGE II-3 PART II [illegible] REPORT "BYPASSING"	☑ YES	☐ NO	☑ N/A
(o) ANY HYDRAULIC AND/OR ORGANIC OVERLOADS EXPERIENCED.	☑ YES	☐ NO	☐ N/A

Form Approved
OMB No. 158 - R0073

[illegible]	PERMIT NO.

J - Compliance Schedules

TTEE IS MEETING COMPLIANCE SCHEDULE. ☐ YES ☐ NO ☑ N/A *(Further explanation attached ______)*

ECK APPROPRIATE PHASE(S):

THERE IS NO SCHEDULE

- ☐ (a) THE PERMITTEE HAS OBTAINED THE NECESSARY APPROVALS FROM THE APPROPRIATE AUTHORITIES TO BEGIN CONSTRUCTION.
- ☐ (b) PROPER ARRANGEMENT HAS BEEN MADE FOR FINANCING *(mortgage commitments, grants, etc.)*.
- ☐ (c) CONTRACTS FOR ENGINEERING SERVICES HAVE BEEN EXECUTED.
- ☐ (d) DESIGN PLANS AND SPECIFICATIONS HAVE BEEN COMPLETED.
- ☐ (e) CONSTRUCTION HAS COMMENCED.
- ☐ (f) CONSTRUCTION AND/OR EQUIPMENT ACQUISITION IS ON SCHEDULE.
- ☐ (g) CONSTRUCTION HAS BEEN COMPLETED.
- ☐ (h) START-UP HAS COMMENCED.
- ☐ (i) THE PERMITTEE HAS REQUESTED AN EXTENSION OF TIME.

SECTION K - Self-Monitoring Program

Part 1 – Flow measurement *(Further explanation attached ______)*

PERMITTEE FLOW MEASUREMENT MEETS THE REQUIREMENTS AND INTENT OF THE PERMIT. DETAILS:	☑ YES	☐ NO	☐ N/A
(a) PRIMARY MEASURING DEVICE PROPERLY INSTALLED.	☑ YES	☐ NO	☐ N/A
TYPE OF DEVICE: ☑ WEIR ☐ PARSHALL FLUME ☐ MAGMETER ☐ VENTURI METER ☐ OTHER *(Specify ______)*			
(b) CALIBRATION FREQUENCY ADEQUATE. *(Date of last calibration ______)*	☑ YES	☐ NO	☐ N/A
(c) PRIMARY FLOW MEASURING DEVICE PROPERLY OPERATED AND MAINTAINED.	☑ YES	☐ NO	☐ N/A
(d) SECONDARY INSTRUMENTS *(totalizers, recorders, etc.)* PROPERLY OPERATED AND MAINTAINED.	☑ YES	☐ NO	☐ N/A
(e) FLOW MEASUREMENT EQUIPMENT ADEQUATE TO HANDLE EXPECTED RANGES OF FLOW RATES.	☐ YES	☑ NO	☐ N/A

Part 2 – Sampling *(Further explanation attached ______)*

PERMITTEE SAMPLING MEETS THE REQUIREMENTS AND INTENT OF THE PERMIT. DETAILS:	☐ YES	☑ NO	☐ N/A
(a) LOCATIONS ADEQUATE FOR REPRESENTATIVE SAMPLES.	☐ YES	☑ NO	☐ N/A
(b) PARAMETERS AND SAMPLING FREQUENCY AGREE WITH PERMIT.	☑ YES	☐ NO	☐ N/A
(c) PERMITTEE IS USING METHOD OF SAMPLE COLLECTION REQUIRED BY PERMIT. IF NO, ☐ GRAB ☐ MANUAL COMPOSITE ☑ AUTOMATIC COMPOSITE FREQUENCY 24HRS	☑ YES	☐ NO	☐ N/A
(d) SAMPLE COLLECTION PROCEDURES ARE ADEQUATE.	☐ YES	☑ NO	☐ N/A
(i) SAMPLES REFRIGERATED DURING COMPOSITING	☐ YES	☑ NO	☐ N/A
(ii) PROPER PRESERVATION TECHNIQUES USED	☑ YES	☐ NO	☐ N/A
(iii) FLOW PROPORTIONED SAMPLES OBTAINED WHERE REQUIRED BY PERMIT	☑ YES	☐ NO	☐ N/A
(iv) SAMPLE HOLDING TIMES PRIOR TO ANALYSES IN CONFORMANCE WITH 40 CFR 136.3	☑ YES	☐ NO	☐ N/A
(e) MONITORING AND ANALYSES BEING PERFORMED MORE FREQUENTLY THAN REQUIRED BY PERMIT.	☑ YES	☐ NO	☐ N/A
(f) IF (e) IS YES, RESULTS ARE REPORTED IN PERMITTEE'S SELF-MONITORING REPORT.	☐ YES	☑ NO	☐ N/A

Part 3 – Laboratory *(Further explanation attached ______)*

PERMITTEE LABORATORY PROCEDURES MEET THE REQUIREMENTS AND INTENT OF THE PERMIT. DETAILS:	☑ YES	☐ NO	☐ N/A
(a) EPA APPROVED ANALYTICAL TESTING PROCEDURES USED. *(40 CFR 136.3)*	☑ YES	☐ NO	☐ N/A
(b) IF ALTERNATE ANALYTICAL PROCEDURES ARE USED, PROPER APPROVAL HAS BEEN OBTAINED.	☐ YES	☐ NO	☑ N/A
(c) PARAMETERS OTHER THAN THOSE REQUIRED BY THE PERMIT ARE ANALYZED.	☑ YES	☐ NO	☐ N/A
(d) SATISFACTORY CALIBRATION AND MAINTENANCE OF INSTRUMENTS AND EQUIPMENT.	☑ YES	☐ NO	☐ N/A
(e) QUALITY CONTROL PROCEDURES USED.	☑ YES	☐ NO	☐ N/A
(f) DUPLICATE SAMPLES ARE ANALYZED. ______ % OF TIME.	☑ YES	☐ NO	☐ N/A
(g) SPIKED SAMPLES ARE USED. ______ % OF TIME.	☑ YES	☐ NO	☐ N/A
(h) COMMERCIAL LABORATORY USED.	☐ YES	☑ NO	☐ N/A
(i) COMMERCIAL LABORATORY STATE CERTIFIED.	☐ YES	☐ NO	☑ N/A

LAB NAME ______

LAB ADDRESS ______

PERMIT NO.

ffluent/Receiving Water Observations *(Further explanation attached ✓)*

NO.	OIL SHEEN	GREASE	TURBIDITY	VISIBLE FOAM	VISIBLE FLOAT SOL	COLOR	OTHER

(Sections M and N: Complete as appropriate for sampling inspections)

SECTION M - Sampling Inspection Procedures and Observations *(Further explanation attached ___)*

☑ GRAB SAMPLES OBTAINED
☐ COMPOSITE OBTAINED
☐ FLOW PROPORTIONED SAMPLE
☐ AUTOMATIC SAMPLER USED
☑ SAMPLE SPLIT WITH PERMITTEE
☑ CHAIN OF CUSTODY EMPLOYED
☐ SAMPLE OBTAINED FROM FACILITY SAMPLING DEVICE

COMPOSITING FREQUENCY __________ PRESERVATION __________

SAMPLE REFRIGERATED DURING COMPOSITING ☐ YES ☐ NO

SAMPLE REPRESENTATIVE OF VOLUME AND NATURE OF DISCHARGE __________

SECTION N - Analytical Results *(Attach report if necessary)*

OAK RIDGE RESEARCH INSTITUTE
RESEARCH LABORATORY
113 UNION VALLEY RD.
OAK RIDGE, TN 37830

September 7, 1983

U.S. House of Representatives
Committee on Science and Technology
Suite 2321 Rayburn House Office Building
Washington, D.C. 20515

Dear Mr. Chairman and Madame Chairman:

This letter was prepared to answer the questions of your letter of August 12, 1983. The answers to these questions are provided on a separate page which we hope adequately addresses your questions.

Should you require any additional information, please feel free to call or write.

Sincerely,

Nathaniel W. Revis
Director

NWR:jh

Enclosure

ANSWERS TO QUESTIONS FROM THE COMMITTEE ON SCIENCE AND TECHNOLOGY

(1) 5 (Toxicologist, biochemist, chemist, cell biologist, and environmental scientist)

(2) Yes

(3) Tooth Fillings Mercury Amalgam (A mixture of elemental mercury with small quantities of various other elements)
Mecurochrome One atom mercury (elemental) in the molecule dibromofluorescein or dibrom-oxymercuryfluorescein

(4) We cannot be sure that the samples obtained from East Fork Poplar Creek are representative of the mercury levels in this creek because, only one sample was obtained at each location. However, we hope in the future that we can obtain additional samples to adequately address this question.

(5) In acute feeding studies the volume of sample will dictate the amount that can be intubated into an experimental animal. A volume no greater than 1% of body weight is the dose frequently used in acute feeding studies. For example, an animal weighing 50 grams would be given a dose up to 0.5 ml. When the volume is increased above 1% of body weight, animals may regurgitate the sample and/or develop changes (i.e. morphological damage) in the gastrointestinal tract. In the present studies the volume fed as a percent of body weight to the mice, rats and pigeons were 1, ,8 and 0.9% respectively. In the present studies, attempts were made to increase the volume (and thus the dose of soil)but the animals (i.e. mice) regurgitated a significant amount of the dose as indicated in my testimony. We also attempted to decrease the ratio of saline to soil however, we were unable to dispense this thick slurry into the animal. We are in the process of expanding the acute study by feeding animals chronically (i.e. 3 times per week for 104 weeks) soil sediment from East Fork Poplar Creek.

(6) Based on the amount of mercury absorbed from the soil sediment and soil sediment spiked with mercury (i.e. amount observed in kidney & liver) and previous reported dose requirement to induce a 10% chance of neurological damage, the number 30 times the present level of mercury observed in the soil sample was calculated.

(7) No

(8) The contrast, in paragraph II. between the doses required to induce the onset of neurological signs at 10% frequency in either a single-dose or continuous-dose feeding mode, is an attempt to compare a best and worst case situation.

The 28 kg value represents the top of a whole range of values depending on where the soil sample was taken (see Table 6). These values were calculated assuming total absorption of methylmercury, 7% absorption of inorganic mercury, and a target body burden of 40 mg. This would represent a 'best case' situation because that amount of soil is too large for anyone to consume.

Table 5 envisages a 'worst case' situation in which, by the consumption of small amounts of soil, the body burden would build up to the same toxic level. To achieve this worst case scenario, we assumed a biological halftime of 64 days, which is at the low end of the reported range. In addition, as stated in the subscript, an absorption value of 15% for inorganic mercury was taken. Table 5 reports the daily dose required to achieve the same target body burden of 40 mg of mercury in the given times for the soil sample at site 2, which contained the highest levels in our survey. For the other samples the values would be greater, and, in total, greater than the single shot dose for the same soil sample assuming identical absorption rates.

It may be perhaps concluded that this worst case situation also represents a very unlikely set of circumstances.

(9) Yes

(10) A variable amount ranging from 1-100 grams.

(11) Changes in the pH of the water, the salinity of the water and the oxygen content would dictate bacterial concentration in soil. These parameters would also dictate the type of bacteria (i.e. anerobic/aerobic) found in the soil. It has been described that the anerobic bacteria are effective in the synthesis of methylmercury from inorganic and elemental mercury. A change in these variables may affect the type of bacteria which would dictate the rate and amount of methylmercury formed from elemental mercury and/or the salts of mercury. Thus it would be impossible at this point in time to predict what long-term effects may occur with regard to the synthesis of methylmercury. The only way that this question can be adequately assessed is to monitor the level of methylmercury in the soil sediment.

(12) The biological and neurological response of mice, rats and pigeons to methylmercury does mimic the human response. However, higher (i.e. 20%) doses of the methylmercury are required to induce the neurological changes. Furthermore, it has been estimated that the level of methylmercury in the brain necessary for neurological changes in mice and rats is higher (i.e. 20%) than that required to induce neurological changes in humans. It is also established that children and pregnant women (fetus) are more sensitive to all forms of mercury.

However, it is difficult to generalize about the effects of mercury, in particular methylmercury from soil samples on the absorption (GI tract) tissue distribution and cellular changes because of the many potential interactions that can occur *in vivo*. As previously mentioned, selenium will affect the absorption, the tissue distribution, and the toxicological effects of mercury. Thus, for example, high levels of selenium in the soil may reduce the toxicity of mercury observed in the soil sediment samples from East Fork Poplar Creek. Studies are in progress to determine if such interactions are occuring in mice fed soil samples from East Fork Poplar Creek.

OAK RIDGE
CHAMBER OF COMMERCE
1400 OAK RIDGE TURNPIKE • OAK RIDGE, TENNESSEE 37830 • PHONE 615-483-1321

August 26, 1983

Ms Debbie Martin
Room B-374
Rayburn House Office Building
Washington, D.C. 20515

Dear Ms Martin:

This is in response to your question concerning the effect of the mercury contamination on the Oak Ridge business community. Enclosed is a letter from Keith Cole, local developer who feels that his business was adversely affected when the contamination was first reported.

We have no direct knowledge that an industry decided not to locate in Oak Ridge because of this problem. However, we feel it is not without reason that news articles (particularly inflammatory ones) would have n affect on the decision of a company which is weighing carefully the advantages of one community against another.

Because of the high taxes in Oak Ridge as a result of the presence of the federal installations, Oak Ridge has needed to develop a list of assets to offset this problem. A clean environment and the "livibility" of the area has been one of our prime economic development tools. If this image is marred, we will find it difficult to sell the area to new industry. (see enclosed articles)

We appreciate the thorough job being done by the Congressional members and staff. If we can be of any further assistance, please let us know.

Sincerely,

Jeffrey Ginsburg
President

JG/aw
Encl.

RHONDENE
CORP

P.O. BOX 148
OAK RIDGE, TENNESSEE 37830
482-4469

August 17, 1983

Mr. Jeff Ginsburg, President
Chamber of Commerce
1400 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830

Dear Sir:

Relative to our conversation regarding our housing sales this year, I would like to bring you up to date.

As you know, Rhondene Corporation has been constructing town houses and condomiuniums in west Oak Ridge for the last two and one half years. We were the first to build these types of homes in the area and have been well recieved by the market. Our location was selected for its proximity to the Oak Ridge Country Club golf course and along the banks of East Fork Creek. We have always considered this the premere location in the city. We payed a higher than normal price for the land and in addition purchased options for two additional parcels, in total stretching some one and one half miles along the East Fork Creek.

Until the spring of this year our business was good. It appeared that the decision to locate in this particular area was sound, and we were looking forward to starting new phases on the optional properties. However the market very suddenly changed quite drastically. This change coinsided with the publicity surrounding the mercury losses from the Y-12 plant and information that much of this mercury was allowed to enter East Fork Creek. The news media distorted the bad news and made the situation much worse. Several articles incorrectly reported Mortoriums on building in the East Fork flood fringe. Since we are the only residential developement in the area under question, whatever damage done to the market was done to our company. In addition the State Health Department posted the East Fork Creek against fishing and swimming using the large red and black warning signs. These signs are at the point where the creek enters our property along Gum Hollow Road.

Our sales were drastically affected. I will recap our sales history as follows:

PERIOD	UNITS	AVERAGE SOLD PER MONTH
First year sales March, 1981-March, 1982	26	2.16
Second year sales March, 1982-March, 1983	51	4.25
Third year sales March, 1983-August 15, 1983	4	.88

Please keep in mind that the period of lowest sales was also the period of relatively low interest rates on home loans. Additionally, our February and March sales averaged five (5) per month.

We were very optimistic during the first quarter of 1983, and felt that we were going to have an excellent year of significant growth.

An attempt to analyze the extent of our problem is difficult. However if you logically assume that the 4.25 units per month average between March, 1982 and March, 1983 would hold true for the coming year, then the costs of lost sales would be 15.13 units from April to August 15, 1983. This amounts to $1,005,000.00 in lost sales. More than 78% decrease. A logical arguement could be made for numbers on both sides of those above. The point however is quite well made.

I cannot say that the total problem is related to the mercury contamination. Certainly it has had a major impact. It is my personal opinion that it is at least a 90% factor.

We appreciate this opportunity to offer our comments on this issue, and if we may provide additional information please advise.

Sincerely,

JK Cole

J.K.Cole
President

JKC/mla

Oak Ridge Environs Polluted by Mercury

By CAROLYN SHOULDERS

Nuclear weapons facilities at Oak Ridge have released huge quantities of toxic mercury and caused extensive environmental pollution there, according to a U.S. Department of Energy report declassified yesterday.

DOE operations involved in the production of atomic bombs from 1950 to the mid-1960s released an estimated 2.4 million pounds of mercury, a highly poisonous element, into either waterways or the ground surrounding the DOE Y-12 plant, the report says.

IT IS THE largest known mercury contamination in the Southeast and possibly in an even greater area, according to Michael Bruner, assistant commissioner of the state Public Health Department.

"It's a serious environmental problem, and it needs immediate, concentrated attention," Bruner said.

(Turn to Page 2, Column 1)

THE TENNES

Oak Ridge Environs Polluted by Mercury

(Continued From Page One)

The DOE report was declassified for the first time and released to the public yesterday after prodding from the state Public Health Department and after a Clinton, Tenn., weekly newspaper, *The Appalachian Observer*, filed a Freedom of Information Act request.

"IT IS CRITICAL that this situation receive the personal attention of the officials at the highest levels of the Department of Energy and the Environmental Protection Agency," said Sen. Jim Sasser after learning of the report.

Mercury contamination has been found in sediment and fish in the Clinch River up to 35 miles away from the Oak Ridge plant, said Dr. William R. Bibb, DOE director of energy programs.

According to DOE, most of the 2.4 million pounds of mercury was discharged into the environment accidentally.

However, a portion of it — some 430,000 pounds — was discharged intentionally into nearby East Fork Poplar Creek through what was then a routine discharge system, DOE spokesman Wayne Range said.

EAST FORK Poplar Creek runs through the city of Oak Ridge, and the largest known concentration of mercury in creek sediment is found at a bend in the creek within the city limits, said Dr. William R. Bibb, DOE director of energy programs.

The concentration of mercury at the creek bend is 480 parts per million, compared to the normal background level of 0.3 parts per million in that area, Bibb said.

Some, though not all, fish in the creek and the Clinch River have been found in studies during the last four years to have mercury levels which exceed recommended limits by the U. S. Food and Drug Administration, Bibb said.

And, while DOE officials said the East Fork Poplar Creek has never attracted many fishermen, it was as recently as December 1982 that the first public warning was given. The state Public Health Department posted warning signs.

"WE'RE TOLD we have no immediate hazard in terms of the sediment or the water of the creek, but that we should pursue studies on the fish," said the DOE spokesman.

In addition to the mercury released into the creek, some 30,000 pounds is estimated to have evaporated, and the remaining 1.9 million was lost through spills. Most of that is believed to be in the shale of the earth below the plant, said DOE officials.

One spill occurred over the weekend of March 26 and 27, 1966, when a valve was left open by a workman, said Gabe Marciante, DOE environmental engineer.

"WE ARE going to undertake further study to determine what kind of ground contamination or ground water contamination there might be," said Jim Alexander, another DOE spokesman. He said the DOE does not believe there is water contamination.

Knowledge that the report, which has been on file at DOE since 1977, would be made public has instigated further recent study by DOE. Range said a University of Rochester toxicologist, Dr. Thomas Clarkson, was hired recently to study fish and sediment samplings and reported no immediate hazard, but warned that fish studies should be pursued.

There is some concern that Oak Ridge residents have used stockpiled creek sediment as fill, or in gardens, Range said, and DOE has contracted with Bertell Laboratories of Ohio for a $50,000 study of possible pathways of mercury to man through plants or by other means.

OR Plant Released Huge Amounts of Mercury, DOE Report Reveals

by FRANK MUNGER
News-Sentinel staff writer

OAK RIDGE — An estimated 2.4 million pounds of mercury was released into the environment — by spills, accidents or other means — at the Y-12 nuclear weapons plant between 1950 and 1977, according to a report released by the Department of Energy (DOE) yesterday.

The recently declassified version of a 1977 report projects that 475,000 pounds of the mercury ended up in East Fork Poplar Creek, which is used as a drainage ditch at the Y-12 plant and subsequently flows through sections of Oak Ridge.

The state Health Department posted signs along the East Fork last fall to alert residents to the potential health hazard of eating fish caught in the waterway, and efforts to learn more about the mercury have intensified in recent months amid growing community concern.

David McKinney, manager of the Tennessee Water Management Division's Knoxville office, last night said he was "taken aback" by the report. McKinney, who has spearheaded recent investigations into Oak Ridge pollution problems, said DOE previously had led the state to believe that no more than 200,000 pounds had been lost.

He said the huge amounts of mercury cited in the report would force state officials to broaden their study area greatly, with fish samples to be taken soon in Watts Bar Lake. The East Fork joins with Poplar Creek and flows into the Clinch River, at which point it becomes Watts Bar Lake.

"We were already looking at a monumental study effort," McKinney said. "Now that's expanded."

From a limited sampling taken in lower Poplar Creek, 100 percent of at least one species of fish — the buffalo — have exceeded the Food and Drug Administration limits for mercury contamination, he said.

"We're going to be forced to — very rapidly, I would think — join with TWRA (Tennessee Wildlife Resources Agency) to see if that level of contamination is going to hold in Watts Bar Lake," McKinney said.

"The mercury discharged to East Fork is believed to have deposited in sediment along the full length of the creek bed or into the Clinch River (Watts Bar Lake)," according to a news release prepared by DOE.

About 1.9 million pounds of the total estimated mercury loss is believed to have seeped into the ground, apparently coming to rest in geologic formations beneath the weapons facility, DOE officials said. McKinney said these underground deposits are contaminating the ground water, because of the complex water system in the area. "There's no doubt about it," he said.

DOE reported another 30,000 pounds was lost through evaporation or discharged in a gaseous state through exhaust fans.

Members of Tennessee's congressional delegation were given copies of the report before its release. Rep. Marilyn Lloyd, whose district includes DOE's Oak Ridge Reservation, joined with Sen. Jim Sasser in sending a telegram last night to William Ruckelshaus, the Environmental Protection Agency administrator, asking for EPA assistance.

"It is clear that we need confirmation of all of DOE's analyses," Mrs. Lloyd said. "Once these facts are substantiated, we can

please see MERCURY, page A3

The Knoxville News-Se

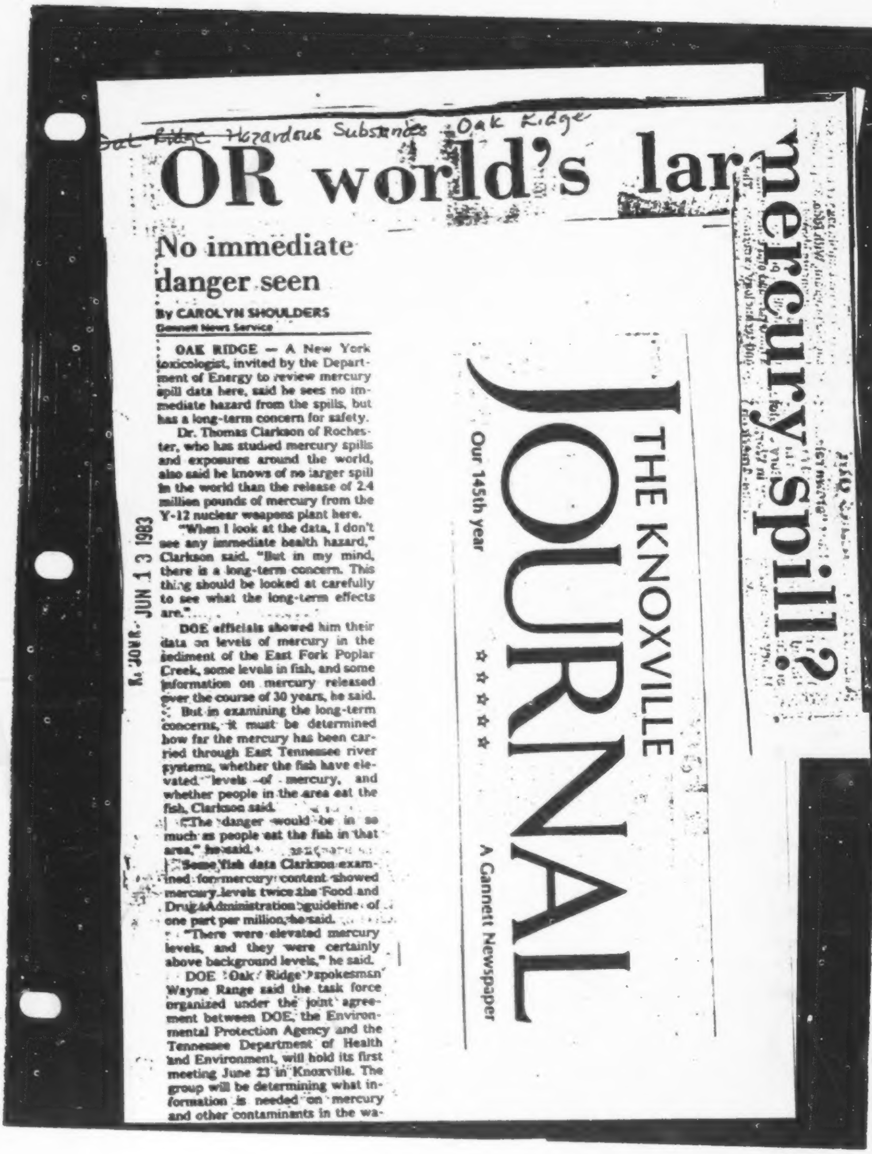
Home Edition

Wednesday, May 18, 1983

Signs posted along East Fork Poplar Creek alert residents to the potential health hazard of eating fish caught in the waterway. The recently declassified version of a

WARNING
THIS STREAM IS CONTAMINATED.
FISH UNSAFE FOR FOOD

Chattanooga Times ran a 4-column spread of this picture



~~Oak Ridge~~ Hazardous Substances Oak Ridge

OR world's lar mercury spill?

THE KNOXVILLE JOURNAL

Our 145th year ☆ ☆ ☆ ☆ ☆ A Gannett Newspaper

Kn. JOUR. JUN 13 1983

No immediate danger seen

By CAROLYN SHOULDERS
Gannett News Service

OAK RIDGE — A New York toxicologist, invited by the Department of Energy to review mercury spill data here, said he sees no immediate hazard from the spills, but has a long-term concern for safety.

Dr. Thomas Clarkson of Rochester, who has studied mercury spills and exposures around the world, also said he knows of no larger spill in the world than the release of 2.4 million pounds of mercury from the Y-12 nuclear weapons plant here.

"When I look at the data, I don't see any immediate health hazard," Clarkson said. "But in my mind, there is a long-term concern. This thing should be looked at carefully to see what the long-term effects are."

DOE officials showed him their data on levels of mercury in the sediment of the East Fork Poplar Creek, some levels in fish, and some information on mercury released over the course of 30 years, he said.

But in examining the long-term concerns, it must be determined how far the mercury has been carried through East Tennessee river systems, whether the fish have elevated levels of mercury, and whether people in the area eat the fish, Clarkson said.

"The danger would be in so much as people eat the fish in that area," he said.

Some fish data Clarkson examined for mercury content showed mercury levels twice the Food and Drug Administration guideline of one part per million, he said.

"There were elevated mercury levels, and they were certainly above background levels," he said.

DOE Oak Ridge spokesman Wayne Range said the task force organized under the joint agreement between DOE, the Environmental Protection Agency and the Tennessee Department of Health and Environment, will hold its first meeting June 23 in Knoxville. The group will be determining what information is needed on mercury and other contaminants in the wa-

The Chattanooga Times

"To give the news impartially, without fear or favor." Vol. C.. . 132 / Chatt. Vednesday, May 18, 1983 Metro Edition / 25 Ce

2.4 Million Pounds of Mercury Dumped by Oak Ridge Y-12 Plant in '50

y Libby Wann
imes Staff Writer

Over two million pounds of toxic mercury were umped into an Oak Ridge creek and released nto the air and ground during the 13-year operaion of a nuclear weapons materials factory in ak Ridge, according to a six-year-old governent report declassified Tuesday.

Mercury and its compounds are poisonous be- ause mercury combines with certain body en- s and causes them to cease functioning.

Revelation of the mercury dumping, which occurred between 1950 and 1963, was described as "nothing short of alarming" by Rep. Marilyn Lloyd, who joined Sen. Jim Sasser in sending Environmental Protection Agency chief-designate William Ruckleshaus a telegram asking EPA to investigate immediately.

"We believe that the improper disposal of a hazardous chemical in this quantity poses very serious questions about the public health and safety," the Sasser-Lloyd telegram said.

The Department of Energy, which declassified a 1977 report describing the mercury dumpings, said preliminary investigations indicate there is no health threat, said DOE spokesman Wayne Range.

"The bottom line is that the report shows that from 1950-1963 that we had some 2.4 million pounds of mercury that was lost in releases to the ground, to the water, to the air or just plain unaccounted for," Range said.

"We feel that there was 475,000 pounds that went from the plant to a small creek known as East Fork Poplar Creek, which flows from the Y-12 plant through the community and winds its way some 20 miles to the Clinch River," Range said.

There is mercury in the sediment and in fish in this creek, Range said.

"Some 30,000 pounds was lost to the air, and most of this was during a four-year period in the late 50s," Range said.

"Then there were losses directly from the plant to the ground underneath the plant," Range s "That was roughly 1.9 million pounds." DOE s uses these buildings as offices, Ranges said.

Mrs. Lloyd accused DOE of deliberateley w holding the report from the public for se years.

"The potential magnitude of this situation nothing short of alarming, and I am now c

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See MERCURY, A7

Westing
could work. Until the late

Mercury

Continued From A1

cerned about the Department's (of Energy) overall policy with regard to hazardous materials," she said.

"The fact that this information was available as early as 1977 yet withheld from the public until now is disturbing. I think we have an obligation to look into this situation to determine if there are any other 'unaccounted-for' materials we should know about," Rep. Lloyd said.

DOE declassified the report after several Oak Ridge citizens found out about it, Ric Ebersole said.

Last fall a valve was left open at the Y-12 weapons facility and about 100,000 gallons of mercury spilled into a tributary of the East Fork Poplar Creek. During cleanup operations, several old-timers at Y-12 remembered the massive quantities of mercury lost more than 20 years ago, said Ebersole, an aide to Mrs. Lloyd. Citizen concern led to the revelation that a 1977 report did exist and hastened its subsequent declassification, Ebersole said.

Range said the state Department of Public Health also pushed for declassification of the report and brought "a number of non-compliance actions against Y-12.

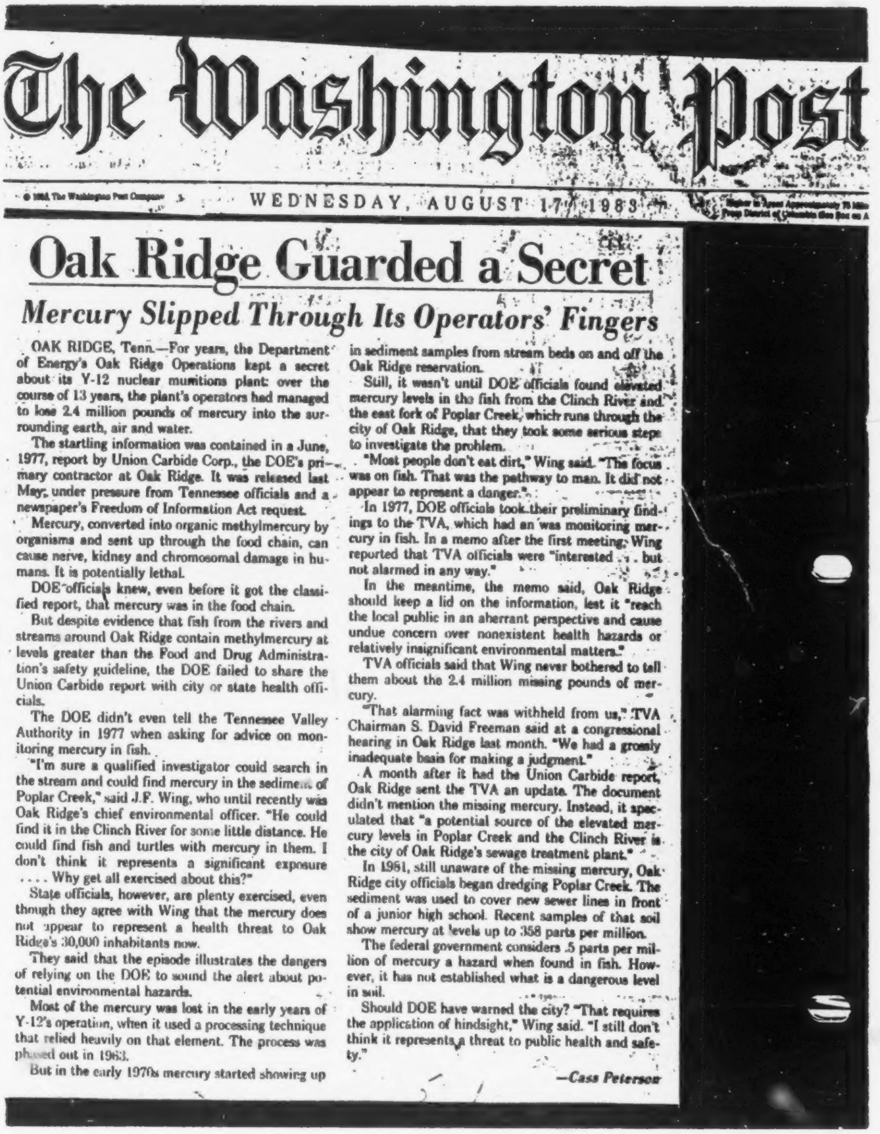
"They (Department of Public Health) said we were probably the worst toxic waste site in the state," Range said. "They also made the point they wanted to see the report dealing with spills."

Mercury was used in a lithium isotope separation operation at the government's super-secret Y-12 plant, where materials for nuclear weapons are manufactured. This particular operation is no longer done, Range said.

Mercury can be deadly to humans. A number of Japanese died after eating fish contaminated with mercury spilled from chemical plants in the late 1950s and early 1960s. In the United States large quantities of tuna and swordfish were taken off the market in 1970 and 1971 because of mercury contamination.

Mercury in stream sediments can convert into organic methylmercury, which becomes more concentrated as it is passed from smaller to larger organisms, according to Dr. Bruce McDuffie, writing in the *Encyclopedia Americana.* Methylmercury accumulates in the liver, kidneys and brain.

Poisoning almost always causes irreversible damage to the nervous system and causes chromosomal breakages in fetuses, McDuffie said. Symptoms of methylmercury poisoning include neurological changes such as lapses of coordination, balance and sensory perception, followed by loss of peripheral vision, slurring of speech and loss of memory, McDuffie said.



The Washington Post

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WEDNESDAY, AUGUST 17, 1983

Oak Ridge Guarded a Secret

Mercury Slipped Through Its Operators' Fingers

OAK RIDGE, Tenn.—For years, the Department of Energy's Oak Ridge Operations kept a secret about its Y-12 nuclear munitions plant: over the course of 13 years, the plant's operators had managed to lose 2.4 million pounds of mercury into the surrounding earth, air and water.

The startling information was contained in a June, 1977, report by Union Carbide Corp., the DOE's primary contractor at Oak Ridge. It was released last May, under pressure from Tennessee officials and a newspaper's Freedom of Information Act request.

Mercury, converted into organic methylmercury by organisms and sent up through the food chain, can cause nerve, kidney and chromosomal damage in humans. It is potentially lethal.

DOE officials knew, even before it got the classified report, that mercury was in the food chain.

But despite evidence that fish from the rivers and streams around Oak Ridge contain methylmercury at levels greater than the Food and Drug Administration's safety guideline, the DOE failed to share the Union Carbide report with city or state health officials.

The DOE didn't even tell the Tennessee Valley Authority in 1977 when asking for advice on monitoring mercury in fish.

"I'm sure a qualified investigator could search in the stream and could find mercury in the sediment of Poplar Creek," said J.F. Wing, who until recently was Oak Ridge's chief environmental officer. "He could find it in the Clinch River for some little distance. He could find fish and turtles with mercury in them. I don't think it represents a significant exposure .... Why get all exercised about this?"

State officials, however, are plenty exercised, even though they agree with Wing that the mercury does not appear to represent a health threat to Oak Ridge's 30,000 inhabitants now.

They said that the episode illustrates the dangers of relying on the DOE to sound the alert about potential environmental hazards.

Most of the mercury was lost in the early years of Y-12's operation, when it used a processing technique that relied heavily on that element. The process was phased out in 1963.

But in the early 1970s mercury started showing up in sediment samples from stream beds on and off the Oak Ridge reservation.

Still, it wasn't until DOE officials found elevated mercury levels in the fish from the Clinch River and the east fork of Poplar Creek, which runs through the city of Oak Ridge, that they took some serious steps to investigate the problem.

"Most people don't eat dirt," Wing said. "The focus was on fish. That was the pathway to man. It did not appear to represent a danger."

In 1977, DOE officials took their preliminary findings to the TVA, which had an was monitoring mercury in fish. In a memo after the first meeting, Wing reported that TVA officials were "interested . . . but not alarmed in any way."

In the meantime, the memo said, Oak Ridge should keep a lid on the information, lest it "reach the local public in an aberrant perspective and cause undue concern over nonexistent health hazards or relatively insignificant environmental matters."

TVA officials said that Wing never bothered to tell them about the 2.4 million missing pounds of mercury.

"That alarming fact was withheld from us," TVA Chairman S. David Freeman said at a congressional hearing in Oak Ridge last month. "We had a grossly inadequate basis for making a judgment."

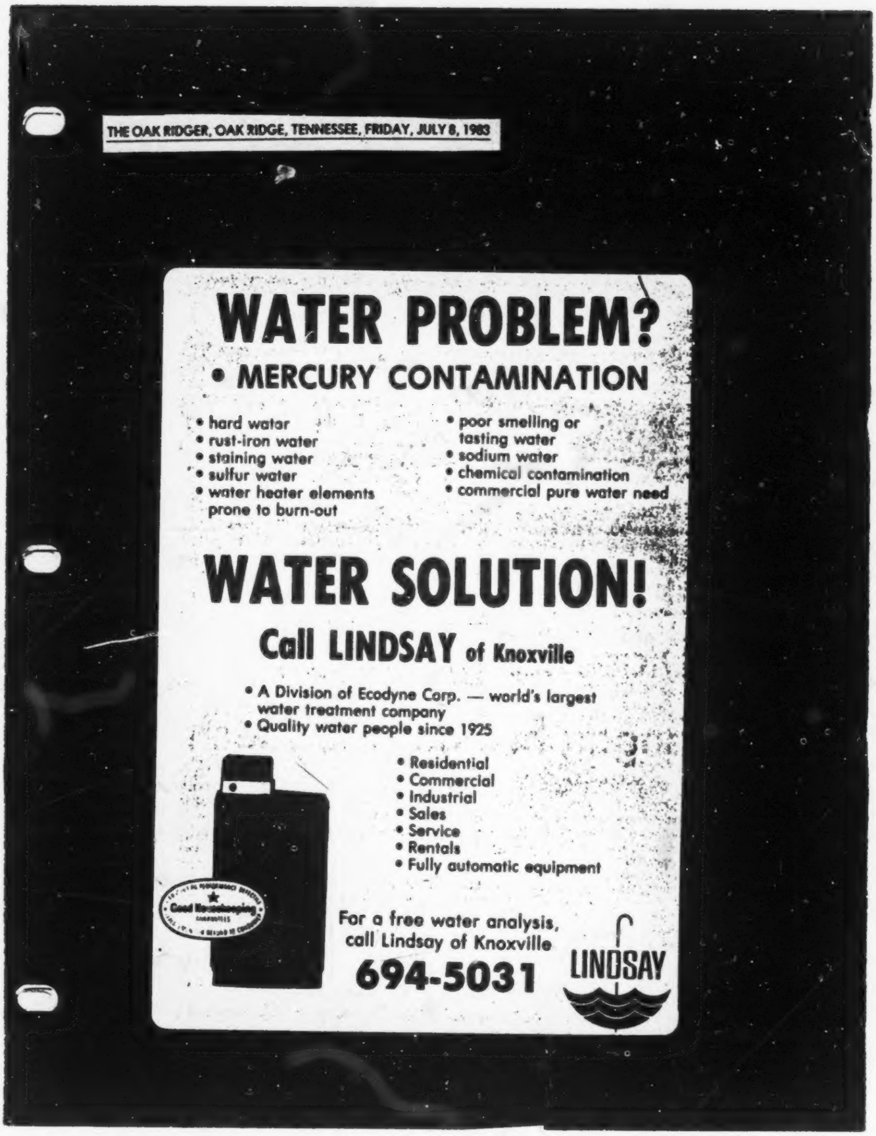
A month after it had the Union Carbide report, Oak Ridge sent the TVA an update. The document didn't mention the missing mercury. Instead, it speculated that "a potential source of the elevated mercury levels in Poplar Creek and the Clinch River is the city of Oak Ridge's sewage treatment plant."

In 1981, still unaware of the missing mercury, Oak Ridge city officials began dredging Poplar Creek. The sediment was used to cover new sewer lines in front of a junior high school. Recent samples of that soil show mercury at levels up to 358 parts per million.

The federal government considers .5 parts per million of mercury a hazard when found in fish. However, it has not established what is a dangerous level in soil.

Should DOE have warned the city? "That requires the application of hindsight," Wing said. "I still don't think it represents a threat to public health and safety."

—*Cass Peterson*



THE OAK RIDGER, OAK RIDGE, TENNESSEE, FRIDAY, JULY 8, 1983

WATER PROBLEM?

• MERCURY CONTAMINATION

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OAK RIDGE, TENNESSEE 37830

August 26, 1983

Congressman Albert Gore, Jr.
Chairman, Subcommittee on
  Investigations and Oversight
U.S. House of Representatives
Committee on Science and Technology
Suite 2321 Rayburn House Office Building
Washington, D.C. 20515

Congresswoman Marilyn Lloyd
Chairman, Subcommittee on
  Energy Research and Production
U.S. House of Representatives
Committee on Science and Technology
B374 Rayburn House Office Building
Washington, D.C. 20515

Dear Chairpersons:

The enclosed material was prepared in response to your August 12, 1983, letter to me. Please let me know if I can be of further assistance. I look forward to receiving the complete hearing record on "The Impact of Mercury Releases at the Oak Ridge National Laboratory".

Sincerely,

Chester R. Richmond

Chester R. Richmond
Associate Director of Biomedical
and Environmental Sciences

CRR:js

Enclosure

August 26, 1983

Additional Questions for
Dr. Chester R. Richmond
and
Dr. Stanley I. Auerbach

1. When were you first apprised of the contents of the 1977 classified report on mercury losses at Y-12? In the context of your 1977 UCND report on environmental monitoring needs for mercury, were you satisfied with the degree and manner in which your recommendations were implemented?

   In a May 1983 Knoxville News Sentinel article (Auerbach); in early 1983 prior to the release of the report in May 1983 (Richmond). No, we were not completely satisfied with the implementation of the 1977 recommendations.

2. Do you believe that the resources of the Oak Ridge National Laboratory have been utilized in an optimum manner in conducting environmental research and monitoring with respect to the mercury losses and potential impact?

   As indicated in our submitted testimony, more could have been done to define the extent and significance of the mercury losses and potential impact.

3. As environmental "czar" for the Union Carbide Nuclear Division over the past several years, what particular steps have you taken to assure improved early warning of environmental problems and ultimate compliance with appropriate federal and state requirements for DOE activities? Have these steps been implemented at ORNL in the same manner in which they have been implemented at other Oak Ridge facilities? Please discuss.

   An extensive monitoring system of liquid and gaseous discharges has been maintained by each of the Oak Ridge Installations. Since 1971 the data judged to be of concern has been accumulated and reported in an annual Environmental Monitoring Report for the Oak Ridge Facilities. The monitoring programs at each facility are under essentially constant review and are upgraded to include new or improved sampling and analytical methods as they are developed. I believe the monitoring has been and is adequate to provide warning of potential environmental problems.

   A point to be kept in mind is that for years the Government's position (AEC/ERDA/DOE) was that environmental regulations applied to emissions/effluents at the boundary of the reservation or Government area and not inside the Government plant areas.

   In the matter of ultimate compliance with Federal and State requirements, I have encouraged through line management the elimination, reduction, and treatment of discharges at their sources. Where feasible and practicable, we plan to recycle materials, thereby eliminating loss to the environment. We are also developing comprehensive long-range Environmental Management Plans for each UCC-ND installation. With the realization that this, although helpful, can only be a part of the solution, I have through several division committees pursued engineering solutions to discharge and disposal problems. Although engineering solutions have been suggested and/or developed, they have not in many cases been implemented simply because resources have not been made available to do so. The actions discussed above are applicable to all installations; however, in the case of the Oak Ridge Gaseous Diffusion Plant, we have been more successful in obtaining the necessary resources for implementation.

4. On page 5 of your testimony, you noted that the Y-12 management has used as an administrative guideline a urinary excretion value of .3 milligrams of mercury per litre. How was this guideline arrived at and what is the basis for it?

The guideline of 0.3 mg/L was adopted by the Y-12 Industrial Hygiene Department when our first urinalysis program was instituted in 1953. Among the first hygienic guides for controlling exposure to mercury in the United States was the Threshold Limit Value (TLV) of 0.1 mg Hg/m^3 recommended in 1946 by the American Conference of Governmental Industrial Hygienists. This TLV was based primarily on the results of the studies by Neal and his associates at the U.S. Public Health Service of workers in the felt-hat and fur-cutting industries in 1937 and 1941. Neal's report concluded that no cases of mercury poisoning were found among workers exposed to less than 0.1 mg Hg/m^3, but that cases did occur at all ranges of exposure above this level. Neal also reported that urinary mercury values above 0.3 mg/L of urine almost invariably indicate exposure of the worker to a level in excess of 0.1 mg Hg/m^3.

In 1956 the AEC Division of Biology and Medicine was asked to help with the mercury problem and contracted with the University of Rochester (a) to explore more sensitive methods to detect early evidence of kidney damage (such as through determination of urinary proteins) and (b) to critically evaluate available information on mercury toxicity. In their reports the Rochester staff stated that although the appearance of mercury in the urine was a sign of mercury exposure, it was not necessarily indicative of incipient chronic mercury poisoning. Removal of personnel from mercury exposure results, they said, in a slow disappearance of symptoms providing the toxicity was not too severe. Thus the disease is reversible in the early stages. The limit suggested by the University of Rochester in 1957 for urine was 0.3 mg/L.

A recognized mercury authority, L. J. Goldwater, writing in 1957 on mercury toxicology indicated the difficulty of developing any hard and fast standard for urinary mercury:

"The laboratory findings in chronic mercurialism are of particular interest, especially the urinary picture. It has been shown that the concentration and amount of mercury in the urine correlate fairly well with the intensity of occupational exposure, but such a relationship is by no means constant. Gibbs has reported that the urinary excretion of mercury in unexposed humans averages about 7.5 µg per day. Thus the mere qualitative finding of mercury in the urine has little or no diagnostic value. With high occupational exposure the urinary mercury may reach a concentration of 4.0 mg/L or more. It has been shown with a reasonable degree of certainty that there is little or no correlation between urinary mercury levels and the severity of symptoms. We may therefore conclude that, while urinary mercury levels may give some indication of the degree of exposure, they are of limited value in the diagnosis of poisoning, since high levels can be found in human subjects who are symptom-free, and low levels in those exhibiting marked evidence of mercurialism. It has been suggested that, in some cases, failure to excrete mercury is a factor in the development of poisoning." (Annals N.Y. Acad. Sciences, 65, p. 501, Apr. 11, 1957)

5. On page 5 of your testimony, you note that a 1970 study of mercury concentration in East Fork Poplar Creek fish showed a maximum concentration of 1.3 parts per million mercury. You also noted that concentrations in other areas of the country like Pickwick Lake and Holston River in Virginia ranged to 2.1 parts per million and 4.4 parts per million respectively. Why is it important to know the mercury concentration in fish in other areas of the country?

It was not until 1970 that it became known generally that inorganic mercury could be a major pollution problem in waterways because of biological methylation and uptake by fish and other aquatic organisms, and Y-12's first studies showing mercury in fish were done in 1970. We quoted the ORNL review article of 1970 to help put these early results into perspective. Then and now we are concerned first of all with the risk involved to the public from the mercury levels in the waterways. The ORNL review study listed dozens of known mercury dischargers in the U.S., dozens of contaminated rivers and streams, elevated levels in fish, wildlife, etc. The two examples cited were chosen out of the many because (a) they were on the Tennessee River and (b) they indicated more severe problems than the local one. Since in 1970 it was presumed that our heavy discharge stopped seven years earlier (1963), it was then assumed that the levels in fish would continually decrease from the measured levels which did not appear to be extraordinarily high.

6. On page 8 of your statement, you mentioned that small amounts of mercury continue to be deposited into East Fork Poplar Creek. What is the reason for this continued discharge of mercury and will this small amount of mercury cause the water to exceed EPA standards for drinking, or present any additional problems?

The level of 1.3 ppb cited on page 8 is the average mercury concentration in the New Hope Pond outflow over a two year period (1981 and 1982) based on flow-proportional monthly composite samples. This amounts to a quantity of 1.4 ounces of mercury each day or a total of 32 pounds a year. This we described as a small quantity continuing to be released. There are, we know, daily fluctuations. Storms cause increases, and in dry weather there are decreases.

This does meet EPA requirements for drinking water which permits 2 ppb mercury versus our 1.3 ppb. But it does not meet certain other requirements. It does not meet the State of Tennessee requirements for water for domestic water supply of 0.2 ppb. EPA specifies that water in streams used for fish and wildlife should also have no more than 0.2 ppb. The State of Tennessee requirement for the same purpose is four times as stringent, 0.05 ppb.

The source of this small discharge is from the buildings and building drain lines that were contaminated with mercury during the process operations 1950 to 1963. Mercury contaninted sludges, rusts, dirt, and even some metallic mercury is in cracks and crevices, in bell and spigot joints in sewer lines, etc. and is gradually worked out as discharges flow through the complex of drain lines, we are carefully studying the locations and are evaluating the options available for eliminating or at least minimizing these problems.

7. On page 8 of your testimony, you mentioned that recently an active program to clean up the sources of mercury has stirred up sediments in pipes and lines and resulted in higher mercury concentrations in the creek. We assume that you have concluded that it is better to take this remedial action and resuspend the mercury in the water rather than allowing conditions to remain at the status quo?

Exactly. In planning this particular cleanup campaign, it was decided to install three "dams" in UEFPC in order to try to retain sediments and keep them from getting into New Hope Pond. This was recognition of the problem that mucking around in these sumps and lines does stir up and may temporarily increase mercury loading in the creek. Most of the Hg that is responsible for the environmental problems is thought to be in the drain lines and sumps of the production buildings. In our opinion there is every reason to believe that there is sufficient mercury in these drainage systems to continue to "bleed" this small quantity into UEFPC for years to come if we accept the status quo. We regard this as unacceptable and are looking at a number of fixes which will result in stopping virtually all mercury discharges over the longer term.

8. On page 9 of your testimony, you mention that "Y-12 will undertake subsurface studies to determine whether mercury accumulations can be located below sites of spills or operational facilities." How will you determine subsurface quantities of mercury?

This is being accomplished through a program of drilling and analysing the sub-surface soils around the buildings where mercury operations took place at Y-12. These areas have been relocated as well as locations where process accidents occurred which resulted in spills to the ground. A description of the details of this subsurface program has recently been published and a copy is attached.

9. On page 9 of your testimony, you mention that there are further studies underway of the Chestnut Ridge sediment disposal site to see whether it is contaminating ground water. What sediments were disposed of at the disposal site and what was the purpose of dredging such material?

Sediments from New Hope Pond were placed in the Chestnut Ridge disposal site. In 1973 New Hope Pond was dredged to its original depth to restore the operating characteristics of the pond, i.e. to provide adequate retention time to permit solids in the stream to settle and be retained in the pond. On essentially an annual basis some sediments are removed from the pond to assure proper operation of sampling equipment, pumps, flow measuring equipment, etc. This material is also retained in the Chestnut Ridge disposal site.

10. On page 10 of your testimony, you mention that the average dietary intake of mercury in this country is about 2.89 micrograms of mercury per day. Later, on page 10, you mentioned that the body equilibrium level of mercury would be about 100 times this 2.89 microgram level or about 300 micrograms of mercury. If we further understand your testimony correctly, the consumption of 100 times this national daily average would bring about signs and symptoms of methylmercury poisoning. Is that correct? You have, therefore, set an "allowable" level of 10 times the national average of mercury intake to indicate a level which, when exceeded, would be cause for some concern. Is that correct? Then we believe on page 12 what you were saying is that if one were to consume about one-quarter pound of Bluegill fish everyday from the areas of the highest concentrations of mercury, one would just be at the "allowable" level of mercury in the body. Is that correct? Is this quantity of fish available in these contaminated areas?

Yes, your interpretation of information from page 10 of the testimony is essentially correct. We believe it would be very difficult to obtain enough fish, to reach this body level, from the portions of the EFPC near Y-12 where the highest levels (i.e., 2.13 μg/g) were found. The EFPC is now posted and fishing is not allowed.

11. May we infer from your statements on pages 14 and 15, regarding the responsibilities of the various divisions in Union Carbide, that one problem you had with Dr. Gough's actions is that he acted outside the Environmental Sciences Division's responsibility in initiating environmental surveillance activities?

For a complete discussion on Dr. Gough's action, please refer to our Supplemental Testimony on the History of Events Associated with the Sampling done by S. B. Gough. The simple answer to your question is, "Yes."

12. On page 15 of your testimony, you state that the Environmental Sciences Division has "recommended in reports and memoranda within the Nuclear Division/DOE Organization that additional studies and monitoring are necessary...." What was the disposition of these recommendations?

These recommendations were referred to DOE/ORO. Most were not acted upon.

13. On page 19 of your testimony, you mentioned that you have a new estimate of 239,000 pounds for discharges of mercury into East Fork Poplar Creek. In May of 1983, DOE estimated in a news release that the total quantity discharged into East Fork Poplar Creek was 475,000 pounds. What is the justification for lowering the estimate of mercury discharged into East Fork Poplar Creek?

The 470,000 pound number comes from the Y-12 1977 study, the report of which was published by DOE in a declassified version in May 1983. It was based on a recounting of the amounts discharged from the 1950's to 1977 based on the historical record and that recounting totaled 235,000 pounds. Because of statements at the time that the water samples were filtered and that therefore only soluble mercury was measured, the 235,000 pound figure was doubled yielding 470,000 pounds. This doubling, of course, was based on the assumption that there was at least as much insoluble as there was soluble mercury.

Now the matter has been looked into more intensively, and it is clear that the simple doubling, perhaps justified for the purpose of the 1977 two week, two person part-time study, is not justified for the purpose of developing the best estimate of discharges to EFPC. A careful recalculation of the historic discharge data now yields 219,000 pounds (instead of 235,000 pounds) and to that we feel should be added estimates of other quantities (1) storm effects losses, (2) metal discharges, (3) discharges before flow measurements started in 1954. Those estimates then increase, the 219,000 pounds to 239,000 pounds. The 239,000 pound estimate made this year (1983) is a more comprehensive and a sounder based estimate than the 235,000 pound estimate in 1977. With regard to the question as to whether it should be doubled, the answer is no. The analytical methods were carefully rechecked as were the sampling procedures and except for one 3-1/2 year period (1974 to 1977), the analyses for the 30 years 1954-1983 measured total, not just soluble, mercury. For the 3-1/2 year period, the values have been doubled in arriving at the 239,000 pounds.

The authors of the 1977 estimate were understandably mislead because the samples being taken at that time were in fact being filtered and only soluble mercury was being measured. But for all the time prior to January 1974, and especially in the 1955-1963 Colex period when the great bulk of the 239,000 pounds was discharged, the analyses did in fact measure total, not just the soluble fraction.

14. On page 24 of your statement, you state that in 1975 the president of Union Carbide Nuclear Division, Mr. R. F. Hibbs, sent a letter to Mr. Hart, the former manager of DOE Oak Ridge Operations, noting that fish were contaminated with mercury in an excess of the FDA guidelines and that further monitoring and sampling was necessary. Why did it take until June 1977 for the Elwood follow-up report to be issued?

The letter from Mr. Hibbs was sent to DOE (ERDA) ORO in December 1975. In early 1976, the Environmental Sciences Division was authorized to carry out a sampling and survey program in Poplar Creek in the vicinity of ORGDP. The samplings were done in May, June, and October 1976. Analyses of samples, report preparation, and internal review accounted for the report not being issued until June 1977.

15. On page 26 of your testimony, you seem to imply that the impetus for all of the mercury studies came from the Oak Ridge Gaseous Diffusion Plant management rather than the Y-12 management. What input did the Y-12 management have in the analysis of mercury contamination? Why weren't they asked to participate in the fish sampling and other studies of mercury contamination relative to their discharges in East Fork Poplar Creek?

We did not intend to imply that the impetus for all of the mercury studies came from the Oak Ridge Gaseous Diffusion (ORGDP) management. The 1976 study was proposed and discussed at a meeting attended by all interested groups, Y-12 included. ORGDP supported the study as I indicated to determine if the mercury was coming from Y-12 ("upstream sources") or from ORGDP. I do not know and our records do not indicate if the Y-12 environmental group was formally asked to participate in the study. Certainly all personnel participating in the meeting were aware of the fact that mercury contamination was a potential problem in the East Fork of Poplar Creek.

Y-12 management was concerned about the mercury problem as early as 1950 when the first pilot plants were built. Because the process was classified for security reasons there was no public discussion, but concern is a matter of record in written reports to the AEC.

The early concerns focused on protecting worker health; however, in 1962 Y-12 management initiated the construction of New Hope Pond to reduce the migration of sediments into East Fork of Poplar Creek, and in 1970, upon becoming aware of the biological conversion of inorganic mercury to the toxic methyl mercury, Y-12 management initiated a study to determine the mercury concentrations in East Fork Poplar Creek fish. This study showed a range of 0.32 to a high of 1.30 ppm.

16. You mentioned on page 31 of your statement that certain remedial actions were taken to clean up the sources of mercury contamination. Specifically, what was done? On page 33 of your testimony, you note that many of the previous studies had not been sufficiently comprehensive to satisfy the needs for monitoring and determining potential remedial actions. In your view, why wasn't the scope of these initial studies wide enough to draw conclusions regarding necessary remedial actions?

(a) The apparent contradiction comes from not understanding that Y-12 has been involved in mercury cleanup ever since 1963 when production stopped. Initially the cleanup involved draining and reflasking of hundreds of thousands of pounds of mercury. There were major cleanups associated with dismantling of one of the plants in 1966, others in 1977, etc. This last effort is not the first, nor the last. It is not possible to undertake a one-time cleanup to eliminate all remaining mercury in the Y-12 Plant. We are concerned with trying to eliminate or at least to minimize the remaining mercury in the plant which is contributing to the small, but objectionable amount of mercury going into UEFPC. Each cleanup program is designed to be within constraints of time and budget and are focusing on smaller quantities of mercury each time. The study of active sources in December 1982 analyzed discharges of drain lines into the Upper East Fork of Poplar Creek, and the summer 1983 study analyzed flows and concentrations upstream of the discharge points in various parts of the drainage systems throughout the Y-12 Plant. We now are in the process of attempting to pinpoint the precise location of the remaining mercury sources. We have pretty well identified locations, but pinpointing is the key to developing cost-effective remedial actions to eliminate the problems. To illustrate, it would be ineffective and a waste of time and money to line or to bypass a contaminated sewer line if the primary source is in the building or in water seeping into the sump from the groundwater.

(b) It is difficult to render judgement on previous decisions made by other authorities. I can only assume that the responsible authority (DOE/ORO) did not deem the additional effort necessary.

17. ORNL has produced numerous environmental analyses, such as environmental report statements, during the past several years. In reply to Congressman Gore's question at the hearing concerning the adequacy of completeness of the presentation of the mercury problem in those reports, Mr. LaGrone acknowledges DOE could have done a better job. Do you believe the reports

issued by ORNL over the years present a comprehensive picture to the public of the extent, degree, and potential impacts at Oak Ridge of the mercury pollution? To what extent did DOE provide ORNL guidance and exercise control over the presentation of the mercury problem in those reports?

ORNL has issued a limited number of reports dealing with the mercury contamination in the Oak Ridge area. These were the June 1977 (Elwood) report, the Environmental Assessment of the ORGDP, Ecological Studies of the Biotic Communities....ORGDP, Technical Background information for the ORNL Environmental and Safety Report, Environmental Analysis of the....(X-10) site, and Mercury Contamination in East Fork Poplar Creek and Bear Creek. ORNL was not requested to sample or study East Fork Poplar Creek until 1982. Earlier (1975) assessments that provided a preliminary overall assessment of the mercury contamination at Oak Ridge were prepared for ERDA and were not made available to the public.

The Annual Environmental Monitoring Reports provide pertinent environmental monitoring data to the media and concerned Government entities and compare such data to established standards. Mercury content of fish in Poplar Creek and the Clinch River was first reported in the 1977 report. Representatives of DOE have provided review of reports. Their questions and comments, in general, were logical ones. In no case that I am aware of did they suggest omitting pertinent data.

In view of the various recent media articles, it must be concluded that the reports did not present a picture sufficiently comprehensive to convey in proper prespective the potential impacts of mercury pollution at Oak Ridge.

Attachment to Question #8, "Additional Questions for
Dr. Chester R. Richmond and Dr. Stanley I. Auerbach"

TASK PLAN

Y-12 SUBSURFACE MERCURY INVESTIGATIONS

BY

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AUGUST, 1983

INTRODUCTION:

In 1977, personnel of the Y-12 Plant prepared a report describing the mercury inventory of the Y-12 Plant from 1950 through 1977. The report, which was released in an unclassified version on March 17, 1983, identified estimates of mercury unaccounted for, as well as estimates lost to the environment. Conclusions on page 4 of the report included the following:

1. In comparing loss data at the sources (9201-4 and 9201-5) and the data for the creek that drains the Y-12 facility with the approximate or actual date of known losses to the earth, there is no evidence that these ground losses had or have reached Poplar Creek.

2. Based on the water quality leaving Y-12 in the past 14 years by effluent sampling, it is concluded that losses to the earth are contained in the shale beneath the spill locations.

To test these conclusions, it is necessary to do site-specific investigations related to geologic conditions as well as to establish a groundwater monitoring system that utilizes sound hydrogeologic principles.

OBJECTIVE:

The purpose of the Y-12 Plant subsurface mercury investigations is to identify if significant mercury contamination to groundwater within and around the Y-12 Plant has occurred, and to seek to determine if mercury accumulations are present in the earth materials below and adjacent to spill locations and around facilities involved in mercury operations.

Utilizing geologic, hydrologic, and topographic information, (principally pre-construction topography), test cores and monitoring wells will be located to intersect the most likely sites of mercury accumulation and to allow sampling of groundwater associated with potentially contaminated locations.

SITE GEOLOGY:

The Y-12 Plant lies within the Valley and Ridge physiographic province. The province is characterized by a succession of southwest trending ridges and valleys. The topography of the site is a function of underlying geologic structures and the differential erosion of underlying rock formations.

The Y-12 Plant is located in Bear Creek Valley, which is bounded by Pine Ridge to the north and Chestnut Ridge to the south. The valley is underlain by rocks of the Cambrian age Conasauga Group (Maynardville, Nolichucky, Maryville, Rogersville, Rutledge, and Pumpkin Valley Formations, listed in descending order). Pine Ridge is held up by the sandy shales and sandstones of the Rome Formation, and Chestnut Ridge is underlain by the dolomitic Knox Group. The geologic strike of strata in the area is approximately N55°E with a dip of approximately 45°SE.

The southeastern part of the plant area (see Plate 1) is underlain by the Maynardville Limestone, which stratigraphically is the highest formation of the Conasauga Group. The formation is composed of clean to shaly limestone with interbeds of shale. Dissolution in the limestone is common, but the intensity of solution activity has been found to decrease with depth. Most of the solution cavities in the Maynardville are clay filled, but open channels are known to exist. The lower contact of the Maynardville Limestone probably occurs just south of buildings 9201-5 and 9201-4 and trends east-west (OR Administrative grid system).

Beneath the Maynardville Limestone is the Nolichucky Shale which is predominantly shale, siltstone, and calcareous shale with interbedded limestone. Most of the areas of potential mercury contamination are underlain by the Nolichucky Shale. Beneath the Nolichucky Shale are the Maryville Limestone, the Rogersville Shale, the Rutledge Limestone, and the Pumpkin Valley Shale. The formation boundaries in the Conasauga Group are definable, but most are quite gradational. Exact boundaries have not been identified in the plant area, but have been extrapolated from work done in the western part of Bear Creek Valley on the DOE reservation. Very few outcrops occur near the Y-12 Plant; a few outcrops of Knox Dolomite occur south of the plant, and an extensive outcrop of Pumpkin Valley Shale can be seen along Bear Creek Valley Road.

Structurally, the Conasauga Group can be quite complex. In Bear Creek Valley at least two joint sets have been identified, one with a strike of N55°E and a dip of 45°NW; a second set with a strike of N35°W and a dip of 35°NE occurs locally. Work done in Melton Valley indicates that joint orientation is extremely variable and is especially dependent upon small scale geologic structures. Spacing between joints is quite variable, from centimeters to meters and is partially controlled by bed lithology and thickness. Because of the regional thrusting, small scale folds, with axes parallel to geologic strike, are also common. Movement has occurred along bedding planes in the Conasauga Group, as indicated by polishing and striations.

The shales of the Conasauga Group form a distinct weathering profile. Thin surface soils grade into a saprolite layer. The saprolite is chemically altered bedrock that still retains the structural features of the bedrock. The relatively porous saprolite grades into less permeable unweathered rock. Areas underlain by limestone tend to have more distinct and thicker soils and a sharper soil/bedrock interface.

Figure 1 is a geologic cross section through part of the Maynardville Formation. Shown in the figure is the relationship among bedding, joints, weathering, and the various lithologies.

TOPOGRAPHY:

The original topography of the Y-12 area was one of abundant knolls and swales. Subsequent construction subdued the topography by the leveling of hilltops and the filling of low areas. Figure 2 shows the location of buildings 9102-4, 9102-5, and 81-10 with their relationship to pre-construction topography. Current topography can be seen in Plate 1. Foundation studies in the plant area indicate that the fill thickness ranges from about 1 to 15 feet, and that the composition varies among clean clay, wood, concrete, and metal to boulders. Based on descriptions of fill material from foundation borings, it is likely that significant voids are likely to occur in the fill material.

HYDROLOGY:

The pre-construction surface water drainage for the Y-12 Plant area is shown in Plate 1. In general, streams drained from a series of hills in the northern part of the plant area to the east fork of Poplar Creek (EFPC). Based on experience in other areas underlain by the Conasauga Group, depth to groundwater in the plant area probably ranged from about 30 feet beneath the hills to essentially zero near streams. In general, the water table was probably a subdued image of the surface topography.

After construction of the Y-12 facilities, all north-south surface drainages were eliminated. In part, these have been replaced by subsurface drains in the plant area. EFPC was also altered; the headwaters is now an underground drainage way and the channel has been significantly straightened in the plant area.

The alteration of the natural hydrologic system, by changing topography and by stream rerouting, has likely caused significant changes in the ground water flow system. The water table in the plant area probably still mimics the topography so that in many areas the lower portion of the fill material may now be saturated. The existence of buried stream channels also alters groundwater flow; they are likely to act as conduits for groundwater movement.

In the Conasauga Group, groundwater flow is largely controlled by fractures, folds and solution features. Groundwater flow, as well as surface water flow, is predominantly south to EFPC. Although the hydraulic gradient is toward EFPC, significant water flow is likely to occur along strike (E-W on ORA grid) due to anisotropic permeability. Movement along strike is along bedding planes, joints, fold axes, and solution cavities.

The surface water divide between EFPC and Bear Creek lies along the western edge of the Y-12 Plant. The groundwater divide probably occurs in about the same area, west of contamination areas. EFPC is a major groundwater discharge zone for the Y-12 area and little flow beneath the creek is likely. The magnitude of groundwater flow along strike into the Bear Creek watershed is unknown and needs to be evaluated.

INVESTIGATION RATIONALE:

Mercury Accumulations. Mercury has been released in and around several buildings at the Y-12 Plant. Plate 1 shows the locations of buildings where documented mercury leakage has occurred. Also noted are specific locations where spills have occurred.

The most probable location of mercury accumulations is in permeable zones in the fill and bedrock and along contacts between rock and fill. Permeable zones include open fractures and solution features in the bedrock and open voids in fill material. Places where more permeable zones contact less permeable zones are likely areas of mercury "pooling." These contacts include the fill/native material contact, the weathered/unweathered rock contact and possibly along the Nolichucky/Maynardville formational contact. Mercury may also tend to pool in pre-construction topographic lows.

The drilling program will focus around likely accumulation areas, attempting to intersect as many features as possible. Just as important as properly locating drilling sites, is obtaining undisturbed soil and rock samples to verify mercury content. Geophysical logging will also be utilized to locate mercury in the subsurface.

Groundwater Monitoring. Just as mercury is likely to accumulate in permeable zones and along material contacts, these are also areas where groundwater movement is greatest. Groundwater flow is generally from higher elevations to lower (towards EFPC), but flow also occurs along strike due to solution features and fracturing.

Groundwater around the spill/leakage locations will be monitored for chemical constituents as well as water levels. Monitoring wells will be concentrated down slope and along strike from mercury use areas. Wells will also be located in pre-construction topographic lows. Monitoring wells will be clustered in groups or "nests." Each nest will consist of several wells with different completion depths at one location. This vertical resolution will allow an estimate of the vertical extent of mercury contamination. A ring of monitoring well nests will be drilled very near use areas, and other nests will be located along likely migration paths down flow from these sites. All monitoring well and exploration hole locations will be mutually agreed upon by Y-12 and ORNL personnel.

DRILLING PATTERN AND TECHNIQUES:

Phase I:

The first phase of drilling will be completion of near site monitoring well nests close by mercury use or spill areas. The drilling of these will allow an estimate of the extent of the contamination problem, as well as evaluation of the site geology. This phase will include about 10 well nests. Each nest will contain three drill holes. The shallowest hole will bottom just below the water table. The second well will be finished at the bedrock/fill interface. If the water table at a location is at this interface, then the second hole will be extended deeper (10 to 20 feet). The deepest hole will be drilled to 75 to 100 feet or more, depending on local geologic conditions (in particular, the presence of solution features or open fractures).

These holes will be continuously sampled using a modified Denison sampler or Shelby tubes until these methods can progress no further. In the deepest hole of the nest, NX size coring, using a diamond bit, will be used when solid rock is encountered. The drilling fluid used during coring will be water. In the two shallow holes rotary drilling with water as a drilling fluid will follow soil sampling. These drilling procedures will allow samples to be retrieved and tested with minimum disturbance. After drilling, each hole will be logged using caliper, neutron, gamma, and electrical logs.

The first phase of drilling is very important in setting the scope of work to follow. The rock cores and samples in conjunction with the logs, will help in evaluating the geologic conditions of the site, and will help in correlating these units with other areas that have been more fully studied. The purpose of the geophysical logs is two-fold. First, because of the electrical properties of mercury, the electrical logs will be utilized to identify mercury-filled fractures, cavities, and zones. Second, the logs allow correlation between holes and characterization of the geologic media.

Phase II:

The second phase of drilling will involve 25 to 35 "exploration" holes. Many of these holes will be drilled immediately adjacent to, or in, spill areas; some holes will be drilled farther away from spill sites, down flow and along strike, to determine the lateral extent of mercury movement. In the fill and weathered bedrock, a modified Denison sampler or Shelby tubes will be used to retrieve undisturbed samples. Those samples will then be tested for mercury content. When bedrock is reached, rotary drilling with water will be used and cuttings will be sampled. Total drilling depth will depend on the vertical extent of mercury migration. Electric logs will be taken for all holes. These holes will be left uncased so that further work can be carried out in them if needed. After this study is complete, these holes will be backfilled with a mixture of cuttings and bentonite to deter the vertical migration of contaminants.

Phase III:

The third phase of drilling will include well nests placed in strategic locations along projected flow paths from the contaminated areas. Locations will be based on data from Phases I and II, but in general will be located outside the zone of contamination. These wells will be drilled, sampled, and logged by the same methods used in Phase I.

The phases of work described are all exploratory in nature. Plans may be expanded or changed as the study progresses and an increase in the scope of work may be required.

MONITORING WELL COMPLETION:

Monitoring wells will be completed with a five-foot-long section of slotted PVC and/or spiral wound stainless steel well screen at the bottom, and PVC casing to the surface. All wells will be of four-inch nominal diameter. The annulus surrounding the screen will be backfilled with clean pea gravel. Above the gravel, a two-foot sand pack will be placed. The annulus will then be sealed with a mixture of bentonite clay and cuttings, with a surface collar of poured concrete. This well completion design will minimize the possibility of vertical migration of water or mercury along the well casing.

All wells will be developed by washing and surge pumping. The wells will be tested by "slug" tests to determine the hydraulic conductivity of the completion zone. The monitoring well network will serve two purposes: (1) levels of dissolved or suspended mercury in groundwater will be determined from water samples, and (2) the hydraulic flow system at the site will be characterized so that directions and rates of contaminant movement can be evaluated. In order to accurately predict mercury movement, the relative rates of movement of water versus mercury must be determined. Laboratory column studies may be required to help determine rates of mercury migration in the subsurface.

SAMPLING AND TESTING PROCEDURES:

Water samples from the monitoring wells will be taken with PVC bailer to prevent contamination. Prior to bailing, wells will be pumped so that fresh formation water is sampled. Sediment and rock samples will be taken from the cores and sealed in plastic bags. Special effort will be made to keep samples intact and to prevent the movement of metallic mercury.

Sediment, rock, and water samples will be quantitatively analyzed for total mercury and, if necessary, for total organic mercury. It may be necessary to determine the amount of soluble mercury present. The analytical procedure to be used is the EPA-approved (manual cold vapor technique) method.

A mercury vapor monitor will be used in the field. This will not represent a quantitative approach, but will serve as a guide to the presence and relative abundance of mercury. As core is uncovered, it will be routinely surveyed with the vapor monitor. Selection of samples for quantitative work will be guided by the results of the vapor monitoring.

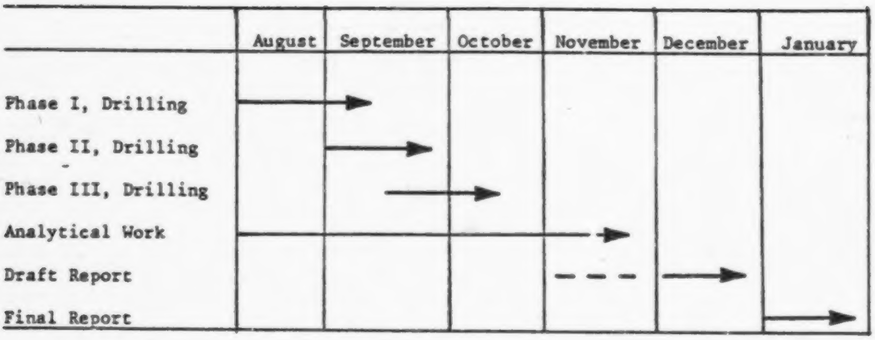
All samples will be sealed to reduce vapor loss and will be stored in a refrigerated environment for six months. During this time samples will be available for additional analytical testing for mercury accumulations. After this period the samples will be stored at ambient conditions for at least 18 months.

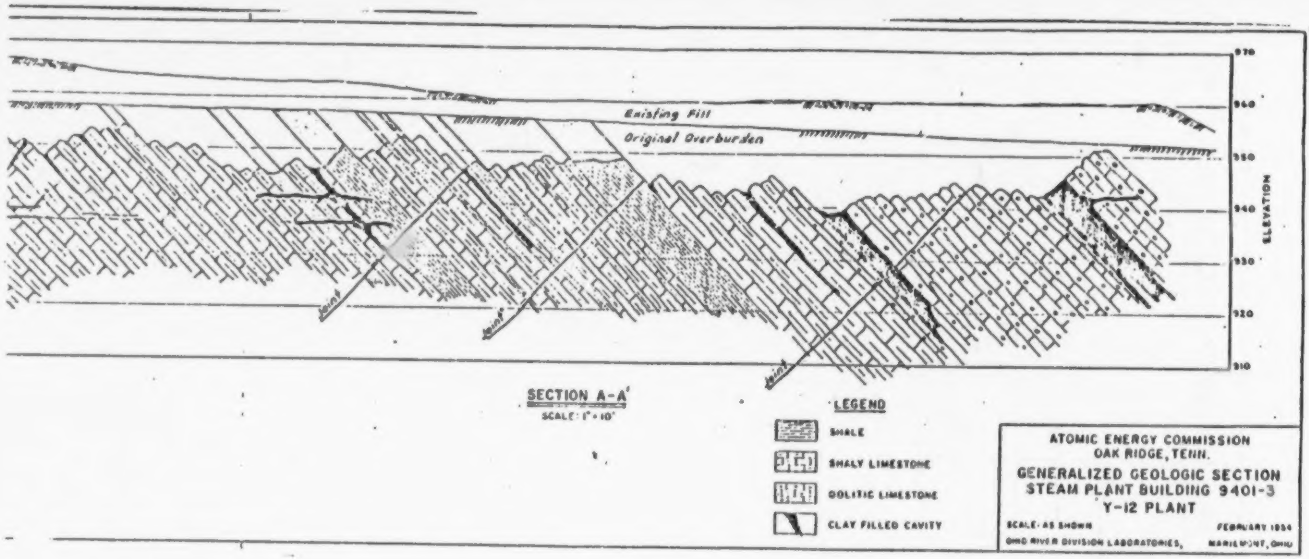
DATA ASSESSMENT:

The geologic, hydrologic, and geochemical data will be continually assessed during the drilling phases to allow modification, if necessary, of future drilling and sampling techniques and plans. Upon completion of the field and laboratory studies, the data will be evaluated to assess the extent of mercury occurrence, the form of the mercury (metallic, organic, etc.), the probable mechanisms and rate of movement of the mercury, and the interrelationship between the site hydrology-geology and mercury occurrences. A report will be prepared.

Because techniques for investigations of elemental mercury in the subsurface are not standardized, it is unknown at present if samples will be quantitatively representative of the extent of mercury contamination. The coring techniques proposed are intended to allow acquisition of representative samples, but because elemental mercury is highly mobile, even these techniques may not yield total recovery. Measurement of the porosity of the subsurface materials from borehole logging studies will be attempted; however, success is uncertain. The accuracy of an estimated mercury inventory in geologic materials will depend in part on porosity determinations. It is also possible that mercury may have migrated beyond the limits of the planned study; for instance, it may have entered solution cavities in bedrock and moved below the limit of drilling. Thus, the accuracy of the quantitative assessment of the total amount of mercury in the subsurface may be limited by the methods available for investigation. If movement of mercury off-site is suspected or required data are missing, the scope of investigation may need to be expanded. Expansion may include further drilling, logging, geochemical determinations, and stream surveys further or deeper from the spill locations.

SCHEDULE


August
September
October
November
December
January
Phase I, Drilling
Phase II, Drilling
Phase III, Drilling
Analytical Work
Draft Report
Final Report


970
960
950
940
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ELEVATION
Existing Fill
Original Overburden
Joint
Joint
Joint
SECTION A-A'
SCALE: 1" = 10'
LEGEND
SHALE
SHALY LIMESTONE
OOLITIC LIMESTONE
CLAY FILLED CAVITY
ATOMIC ENERGY COMMISSION
OAK RIDGE, TENN.
GENERALIZED GEOLOGIC SECTION
STEAM PLANT BUILDING 9401-3
Y-12 PLANT
SCALE: AS SHOWN
FEBRUARY 1954
OHIO RIVER DIVISION LABORATORIES,
MARIEMONT, OHIO

FIGURE 1: Geologic cross section through part of the upper Maynardville Formation

Source: 'Geologic Investigations-Alpha 5 Area, Y-12 Plant', Ohio River Division Laboratories, U.S. Army Corps of Engineers, February 1954.

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE CORPORATION
NUCLEAR DIVISION

POST OFFICE BOX X
OAK RIDGE, TENNESSEE 37830

August 26, 1983

Congressman Albert Gore, Jr.
Chairman, Subcommittee on
Investigations and Oversight
U. S. House of Representatives
Committee on Science and Technology
Suite 2321 Rayburn House Office Building
Washington, DC 20515

Congresswoman Marilyn Lloyd
Chairman, Subcommittee on
Energy Research and Production
U. S. House of Representatives
Committee on Science and
Technology
B374 Rayburn House Office Building
Washington, DC 20515

Dear Chairpersons:

Enclosed are my responses to the questions you sent me with your letter of August 12, 1983. The comments enclosed were sent under the title "Additional Questions for Dr. Stanley I. Auerbach" and were primarily concerned with the actions and activities of Dr. Stephen B. Gough.

The answers to the questions addressed to Dr. Chester R. Richmond and me are being sent separately by Dr. Richmond.

Sincerely,

Stanley Auerbach

Stanley I. Auerbach, Director
Environmental Sciences Division

SIA:lc

Enclosure

Additional Questions for
Dr. Stanley I. Auerbach

1. When did you first learn of the results concerning unaccounted-for mercury in the June 1977 classified report on Y-12 activities?

I first learned of the existence and contents of the June 1977 classified report on mercury losses at the Y-12 Plant on May 18, 1983, from stories in the local newspapers.

2. What difference would it have made, in terms of your decisions and actions, if the Oak Ridge Operations Office had asked you to assess the mercury contamination question in the context of the roughly two million pounds of mercury which was reported as unaccounted-for?

I interpret the phrase "in terms of your decisions and actions," to be limited to my decisions and actions relative to Dr. Gough. One of the premises to this hypothetical question is "if the Oak Ridge Operations Office had asked you to assess the mercury contamination question in the context of the roughly two million pounds of mercury which was reported as unaccounted for." Given this situation, my response would have been to propose, in collaboration with the Health and Safety Research Division and the Analytical Chemistry Division at ORNL and appropriate staff at Y-12, a comprehensive multi-year study to determine the spatial extent and magnitude of the mercury contamination with the goal of defining potential health and environmental risks. Assuming that such a study was in progress, it seems unlikely that Dr. Gough would have taken the actions he did, since he probably would have perceived that his research interests could be accommodated within the scope of such an ongoing study. However, for the purpose of answering this question, I have assumed that Gough took the actions he actually did.

Then, my answer to this hypothetical question depends on whether I assume the June 1977 classified report was declassified or remained classified prior to December 5, 1981. If declassified, the mercury problem at Y-12, while still a problem, would not have been a security issue. A Supervisor's Report would not have been appropriate. However, a meeting with Auerbach, Gough, and Van Winkle still would have been appropriate since Gough's actions still would have demonstrated poor judgement. In Gough's written testimony submitted on July 11, 1983, Gough states that "I feel the sampling was totally within the realm of that expected of a productive and unbiased researcher" (p. 2) and "no individual charged with being creating is asked to first 'o.k.' all of his creative hunches before proceeding in a limited fashion" (p. 13). My response is that a national laboratory is a research organization. It is not a loose collection of individual researchers independently pursuing their own hunches without communication with supervision. In my 30 years at Oak Ridge National Laboratory, I can think of no analogous incident of an individual collecting samples on his own, sending them to an outside laboratory for analysis when they could have been analyzed at ORNL, and approximately six weeks later first mentioning to his supervisor that he had taken these actions in expectation of submitting an official research proposal from ORNL.

If the 1977 report had not been declassified prior to December 5, 1981, then my decisions and actions concerning Dr. Gough might have been similar to what they actually were. But such actions would have depended on the context of the situation and the circumstances created locally under the hypothetical conditions contained in your question.

3. In Dr. Van Winkle's supervisor's report of the interview that took place between you, him, and Dr. Gough, you stated that the monitoring that was done on the mercury contamination did not demonstrate a "health problem or an ecological effects problem." However, you did state that "there is a sociological problem, and thus a potential economic problem, if this type of sensitive information is handled inappropriately." What type of sociological problem, and thus economic problem, were you referring to?

The type of sociological problem I was referring to is a distorted perception of health or environmental risk by the media and public due to selected information becoming available out of context from the total situation. This sociological reaction may then result in an economic reaction involving the hasty marshalling of efforts concomitant with a large expenditure of funds in order to effect a quick "fix" of the perceived problem. Because of the "sociological" reaction, careful evaluation of the extent and magnitude of the problem in terms of potential health and environmental risk is foregone under the pressure of public concern.

4. In Dr. Van Winkle's supervisor's report of the interview that took place between you, him, and Dr. Gough, you state that "Gough's actions constituted unintentional 'misdemeanor' and not a 'felony'." Were you drawing an analogy to place his action in perspective? If no, what violation of the law did you perceive in Dr. Gough's action?

Yes, I was drawing an analogy to place his action in perspective.

5. What was your main problem with Dr. Gough's action relative to the sampling? Did you object to his using the U.S. Geological Survey Laboratory? Were there similar capabilities for the analysis of trace metals in plant tissues at the Oak Ridge National Laboratory?

My main problem with Dr. Gough's action relative to the sampling was his choice of approach in pursuing a matter which at that time was viewed by DOE/ORO and the Y-12 facility as being a sensitive issue, a sensitivity of which Dr. Gough was well aware of. Yes, I did object to his using the U. S. Geological Survey Laboratory without our knowledge, and yes, similar capabilities for the analysis of trace metals in plant tissues were available at ORNL.

6. Dr. Gough charges that he was unfairly criticized in his management of the EPRI Legionella research project because funding for this project was "continually redirected to other projects." Were funds redirected from this project to other activities? Were these DOE funds or were they EPRI funds?

In our opinion, Dr. Gough was not unfairly criticized for his project management of the EPRI Legionella Research project. As manager, he was responsible for all aspects of the project, including fiscal and scientific operations. In his testimony, Gough alleges fiscal diversion in the research project. We have considered the total project from the inception in the fall of calendar year 1980 through midyear of calendar year 1983. On two occasions during this period, manpower charges and costs were not in balance and were subsequently corrected. We conclude that the EPRI project has received full value for the funds provided.

Gough chose not to highlight an issue that existed in the spring of 1982. An internal review in February of 1982 indicated lack of funding resources to complete the work. The reasons for the apparent shortage included: underestimation of manpower rates to be charged, increases in The University of Tennessee's subcontract cost due to unexpected research findings, and addition of one unbudgeted staff-person to the project.

These situations fell within Gough's responsibility to recognize and control and should have been acknowledged by him prior to February 1982. Corrections which were initiated by Gough's management were necessary to reassign personnel and attain supplemental funds to support the EPRI work.

7. Dr. Gough said in his testimony that after he submitted a summary of the USGS findings to Dr. Van Winkle he was subsequently removed as the leading contender for the "Y-12 environmental coordinator position," and was later (on March 26, 1982) ranked as one of the four most likely to be terminated in a RIF. Were these actions taken as punishment for Dr. Gough's actions?

This question contains two unrelated issues. First, Gough was not the "leading contender" for the "Y-12 environmental coordinator position." I was aware of the planned retirement of the then Y-12 Environmental Coordinator within the year, and suggested to Van Winkle early in March 1982 that Gough be encouraged to apply to Y-12 for this potential opening. Sometime in mid-March, Gough sent a letter and resume to Y-12. Screening for the replacement did not begin until the summer of 1982 (approximately six months before the retirement of the incumbent Coordinator) and interviews for the position did not take place until autumn 1982.

The second issue is that Gough was ranked as one of the four Ph.D. staff in the Aquatic Ecology Section of ESD most likely to be terminated at a Reduction-in-Force (RIF) if a RIF became necessary. In January 1982, it became evident that there would be severe budget problems at the Laboratory, due to actions of the Administration and Congress, and that the Laboratory would have to reduce its number of employees (that number reached 700 people over two years). The Aquatic Ecology Section in ESD was particularly affected by these prospective fiscal impacts, with a potential 30% reduction (of the approximately 36 people) having to be made before October 1982. Early in February, Gough and his supervisor, Van Winkle, discussed these reduction-in-force possibilities as was done with many other employees.

During the week of March 8, 1982, Van Winkle informed Reichle of the names of the four staff members (including Gough) in the Aquatic Ecology Section he considered to be at greatest risk. Van Winkle did not start to consider Gough's sampling as a major problem until March 31, 1982, when Van Winkle first mentioned it to his supervisor, D. E. Reichle, after the budget crisis was obvious.

During the week of March 22, Van Winkle informed each of these four staff members that in his judgment the probability of that individual being included in a reduction-in-force was better than 50-50. Eventually, seven people left the division due to funding problems in the aquatic ecology area as part of 700 that left ORNL. The decision and discussions relating to Gough's removal as co-principal investigator on the Legionnaires' Disease Bacteria Project funded by the Electric Power Research Institute occurred prior to March 31, 1982. This action was not taken as punishment for Dr. Gough's actions. The "summary of the USGS findings" was not provided to Dr. Van Winkle by Dr. Gough until April 1 or 2, 1982. Gough had the two-page summary as of March 2, but did not mention it to Van Winkle until a request was made for it.

8. Dr. Gough says that you and others told him that your reaction to his actions would be different if the samples that he had taken were within the city limits and not on the DOE Reservation. Did you say this to Dr. Gough in response to his inquiry and, if so, what was your rationale for that statement?

The premise for this question has been reversed from what Dr. Gough stated in his testimony. Dr. Gough stated (p. 15) that "when I asked if the reaction of Auerbach and others would have been any different if the samples had been taken within the city (i.e., not on the DOE Reservation), the answer was 'no.'" This is correct. As indicated in my response to Question 5, my main problem with Dr. Gough's action relative to the sampling did not relate to where he took the samples. However, that the samples were taken on the DOE Reservation means that Dr. Gough, in an unofficial capacity and accompanied by a nonemployee, ignored signs stating "CLOSED TO PUBLIC. FOR OFFICIAL USE ONLY. US-DOE."

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE CORPORATION
NUCLEAR DIVISION

POST OFFICE BOX X
OAK RIDGE, TENNESSEE 37830

August 9, 1983

Congresswoman Marilyn Lloyd
Chairman, Subcommittee on
Energy Research and Production
U. S. House of Representatives
Committee on Science and
Technology
B374 Rayburn House Office
Building
Washington, DC 20515

Dear Congresswoman Lloyd:

I appreciated the opportunity to participate in the hearings held in Oak Ridge on June 11, 1983, on the mercury contamination problem. One of the witnesses, Dr. S. B. Gough, both in his oral and his submitted testimony, made a number of assertions concerning his activities while a member of the Environmental Sciences Division, Oak Ridge National Laboratory. These include a number of allegations about his treatment subsequent to his sampling of vegetation in East Fork Poplar Creek and Bear Creek in December 1981.

For the purpose of providing a balanced perspective on this matter, I am submitting a statement concerning the history of these matters that reflects our records and understanding of the events that have transpired.

We would appreciate that this statement be made a part of the official record.

Sincerely,

Stanley I. Auerbach, Director
Environmental Sciences Division

SIA:lc

Enclosure

cc: C. R. Richmond, w/enc.

SUPPLEMENTAL TESTIMONY FOR THE JOINT HEARING
OF
THE SUBCOMMITTEE ON ENERGY RESEARCH AND PRODUCTION
AND
THE SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT
OF THE
U. S. HOUSE SCIENCE AND TECHNOLOGY COMMITTEE
ON
THE IMPACT OF MERCURY RELEASES AT THE OAK RIDGE COMPLEX

HISTORY OF THE EVENTS ASSOCIATED WITH THE SAMPLING DONE BY S. B. GOUGH

S. I. Auerbach

Submitted August 1983

HISTORY OF THE EVENTS ASSOCIATED WITH THE SAMPLING DONE BY S. B. GOUGH

The purpose of this supplemental testimony[1] is to provide a history of the events associated with the sampling done by Dr. S. B. Gough during December 1981. It is important to note that Gough's sampling and the reactions of the Environmental Sciences Division (ESD) must be judged in the context of what was then known of the mercury releases at the Y-12 Plant. More importantly these actions should be judged in the context of the atmosphere of sensitivity and national security that pervaded the Oak Ridge Operations Office of the Department of Energy (DOE/ORO). The DOE/ORO had not responded to requests by the Union Carbide Corporation Nuclear Division to do detailed studies on the East Fork Poplar Creek in spite of several formal and informal recommendations made to the Operations Office beginning in 1975.[2] Additionally, this testimony presents information on other activities within Oak Ridge National Laboratory (ORNL) and ESD, unrelated to Gough's sampling, that were a factor in Gough's voluntary resignation from ORNL in June 1982.

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[1] A detailed and documented history of the Environmental Sciences Division's activities in regard to the mercury pollution in the Oak Ridge area covering the years 1975 to the present is contained in the testimony entitled "Summary of Actions and Activities Related to Mercury Releases in the Oak Ridge Area from DOE/UCC-ND-Operated Facilities," by C. R. Richmond and S. I. Auerbach, submitted on July 11, 1983, at the hearings entitled "The Impact of Mercury Releases at the Oak Ridge Complex."

[2] Ibid.

Gough was employed in the Environmental Sciences Division from 1976 to 1982. As an aquatic scientist, he worked on a number of projects dealing with energy-related environmental problems. On Saturday, December 5, 1981, Gough and his brother, Larry (employed as a geochemist/botanist with the U.S. Geological Survey (USGS) in Denver, Colorado), collected six vegetation samples at three locations along East Fork Poplar Creek and at one location on Bear Creek, all on the DOE Reservation. Gough knew where to collect the samples because he was familiar with the prior sampling for mercury and other heavy metals done by the Environmental Sciences Division in the streams of the DOE Reservation, and he knew which types of plants to take because of prior studies by his co-workers. The samples were taken by Larry Gough to the USGS Laboratory in Denver, Colorado, for analysis. This action was followed by a sequence of events during the next six months, terminating when Gough voluntarily left ORNL. This chronology is Appendix 1 of this statement. The following comments are based on this chronology.

Over a month passed (Appendix 1) before Gough reported this action to his then supervisor, Dr. W. Van Winkle,[3] and suggested the possibility of a research proposal. Although he had two other meetings with Van Winkle in early February, it was not until late February (2 1/2 months after the sampling) that Gough again mentioned the sampling and the possible research proposal to Van Winkle.

After another month (March 29 or 30), Gough informed Van Winkle that the results for mercury (but not other heavy metals) were available at the U.S. Geological Survey Laboratory, but they would not be officially released to ORNL without a letter of authorization from Gough's supervision. Van Winkle refused to sign the authorization letter drafted by Gough. Gough had received the data unofficially from his brother on March 2, 1982 (Attachment 3 of Gough's testimony), but he did not offer to provide it until asked by Van Winkle. No information on specific plans for, or scope of, a research proposal was put forth by Gough, although 3 1/2 months had elapsed since his sampling.

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[3] Dr. Van Winkle completed his planned four-year term as Section Head and returned to a research position as of March 1, 1983.

The next day (approximately March 31, 1982) Van Winkle informed his supervisor, Reichle, for the first time of Gough's sampling, of the request for a letter, and of what he then knew of the situation. Van Winkle and Reichle agreed that before the situation developed any further ESD management needed more information on sample sites, what was sampled, and what heavy metals were being analyzed. Van Winkle requested this information from Gough and was provided, on or about April 1-2, 1982, with the data that Gough had obtained previously. With this additional information in hand, Reichle and Van Winkle again discussed the situation during the week of April 5, 1982. Because of Reichle's greater awareness of the sensitivity of and the possible security involved with the mercury issue at both Y-12 and DOE/ORO due to past actions, Reichle decided that he needed to bring the situation to the attention of Dr. C. R. Richmond in the absence of Auerbach.

On April 13, 1982, the day following Auerbach's return to the Laboratory from a two-week trip and the discussion of this matter with Reichle, Auerbach contacted the USGS and spoke to Dr. Harry A. Tourtelot, Chief, Branch of Regional Geochemistry.

Tourtelot was familiar with the samples because he had requested the supervisory approval for their release, and he said he suspected an anthropogenic (human-derived) source due to the highly elevated levels of mercury. Auerbach explained to him that the samples came from two streams that received input from a nuclear weapons fabrication facility and that they had been taken without the knowledge or approval of the operating contractor (UCC-ND) or the Department of Energy. Upon learning that, Tourtelot asked what Auerbach's wishes were, since normally, a formal interagency agreement is necessary before one federal agency performs work for another agency. Auerbach asked whether it would create problems for Tourtelot if Tourtelot returned the unauthorized samples. Tourtelot readily agreed to do so, offering to see if the data had been entered into their computerized files of USGS chemical data. A few days later Tourtelot called and informed Auerbach that the samples had been sent back and that the data had not been entered into the computer files. No cover letter was sent with the samples and none was requested because the USGS had not been officially involved in this sampling, nor did they wish to be. The samples were reanalyzed upon their return to Oak Ridge, and these results, along with the results of the analysis by the USGS, were included in the September 7, 1982, report (Van Winkle et al. 1982), including proper attribution to Gough (Ref. 2 of the report).

On April 20, 1982, Auerbach and Van Winkle met with Dr. C. R. Richmond, in his capacity as UCC-ND Director for Health, Safety, and Environmental Affairs, and with Dr. J. C. White, Director of Technical Services and Plant Protection at the Y-12 Plant. Auerbach and Van Winkle reviewed the incident, described the sampling sites, and presented the results of the analyses that Gough obtained from his brother. The high concentrations of mercury were not unexpected when compared with data already obtained in other sampling studies in the Poplar Creek system over the past decade. Discussion also took place concerning Gough's rationale for undertaking such a sampling. It was agreed that Auerbach and Van Winkle would have a supervisors' meeting with Gough to clarify a number of points and that they would file a Supervisor's Report.

On April 29, 1982, Auerbach and Van Winkle met with Gough. He was informed that he had used poor judgment in this matter by not obtaining supervisory concurrence "and that the proper approach would have been to work through the system, regardless of the perceived low probability of obtaining authorization to collect such samples" from Y-12 or ORO. "The entire interview was cordial and ended on the note that every organization has guidelines by which one is expected to function and which must be understood and accepted, even if we do not like all of them. Gough apologized for the problems he had caused and assured us that this one act was not indicative of a generic inability to perceive bureaucratically sensitive situations." He was not "reprimanded" for his concern over mercury contamination, which is natural and commendable for an environmental scientist, but for his choice of approach in pursuing a matter which at that time was viewed locally as having national security implications.

Our concern over Dr. Gough's action stemmed not only from the sampling in relation to the Y-12 Plant facility, but also from his stated intention to use the data as a basis for a joint research proposal with his brother at the U.S. Geological Survey in Denver to study uptake and accumulation of mercury and other heavy metals in various types of living material. We still do not understand what additional information would have been obtained by this sampling that was essential for such a proposal. We do not understand why Gough did not inform his supervisor, or anyone else in ESD, of the Saturday sampling on the following Monday morning, December 7, 1981. Finally, we do not understand why the samples were taken to the USGS Laboratory in Denver without at least first investigating the feasibility of having the analyses done at ORNL.

Gough had ample time (December 1981 through March 1982) to prepare a draft conceptual research proposal. He had available to him all the background literature on previous ESD work and others on heavy metals in the environment. He also had the option of developing a proposal for support under the Laboratory's Seed Money Project. This project provides support to individual staff members whose proposals are judged sufficiently meritorious scientifically. Such proposals do not require approval of section heads or division directors. None of these options were explored by him. The Laboratory has a formal complaint procedure with counselors (ombudspersons) that can be utilized by personnel who have a complaint or problem that cannot be resolved through normal management channels. Gough made no attempt to avail himself of this procedure at anytime.

It is now clear that Gough's sampling on December 5, 1981, was part of a complex chain of events resulting in the declassification of previously classified information on the magnitude of mercury releases at the Y-12 Plant, due to the Freedom of Information (FOI) request by the Appalachian Observer (weekly newspaper). Concomitant with a change in management at DOE/ORO, there was a radical shift at the highest level of DOE/ORO to openness and candor with respect to health and environmental concerns regarding mercury and other contaminants at all DOE/ORO facilities. The ESD was as shocked in May 1983 as was the general public by the magnitude of the mercury releases. We enthusiastically welcome the change in attitude at DOE/ORO and the numerous studies, cleanup activities, and waste disposal plans now in progress or being considered. We strongly maintain, however, that at the time of the Supervisor's Report under the local policies then prevailing, the report was appropriate and necessary given the atmosphere of sensitivity and national security on the mercury issue that pervaded DOE/ORO. In fact, it would have been managerially irresponsible not to have prepared a Supervisor's Report.

There were other activities within ORNL and ESD, unrelated to Gough's sampling, that were a key factor in Gough's voluntary resignation from ORNL in June 1982. By the beginning of January 1982, it became evident that once again there would be severe budget problems at the Laboratory, due to actions of the Administration and Congress, and that the Laboratory would have to reduce its number of employees (that number reached 700 people over two years). The Aquatic Ecology Section in ESD was particularly affected by these prospective fiscal impacts, with a potential 30% reduction (of the approximately 36 people) having to be made before October 1982. During February, Environmental Sciences Division management was openly and candidly advising staff, especially those in the Aquatic Ecology Section, of the impending budget crises. The Environmental Sciences Division management let it be known that the division was uncertain of the status of positions should there be cuts in budgets which would require a reduction-in-force, and that staff, in their best interests, should not ignore other promising employment opportunities. Early in February, Gough and his supervisor, Van Winkle, discussed these reduction-in-force possibilities as was done with many other employees.

During the week of March 8, 1982, Van Winkle informed Reichle of the names of the four staff members in the Aquatic Ecology Section he considered to be at greatest risk. Gough was one of these four individuals, although the bases for selecting Gough did not involve his collection of the samples in December 1981. As indicated above, while he had reservations about the appropriateness of Gough's unofficial sampling, Van Winkle did not start to consider Gough's sampling as a major problem until March 31, 1982, when Van Winkle first mentioned it to his supervisor, D. E. Reichle, after the budget crisis was obvious.

During the week of March 22, Van Winkle informed each of these four staff members that in his judgment the probability of that individual being included in a reduction-in-force was better than 50-50. Eventually, seven people left the division due to funding problems in the aquatic ecology area as part of 700 that left ORNL. Likewise, the decision and discussions relating to Gough's removal as co-principal investigator on the Legionnaires' Disease Bacteria Project funded by the Electric Power Research Institute occurred prior to March 31, 1982, and were not influenced in any way by Gough's December 1981 sampling.

On May 4, 1982, a Voluntary-Reduction-in-Force (VRIF) program was announced by the Laboratory. Gough apparently had been seeking another job since sometime in February, well before we expressed concern over the mercury sampling. Consequently, by the time of the VRIF announcement he had already accepted a new position. On June 1, 1982, Gough requested that he be considered for a VRIF, which was approved on June 8, 1982. Gough left the Laboratory on June 18, 1982.

We regret that Gough's actions and our response to them have been misinterpreted by the media and even DOE/ORO. The role of ORNL's Environmental Sciences Division in environmental control matters locally has been distorted. As a scientific research organization, the Environmental Sciences Division continues to strive for and maintain its high standards of excellence for all its staff in all their activities.

Reference:

Van Winkle, W., R. W. Counts, J. G. Dorsey, J. W. Elwood, V. W. Lowe, Jr., R. McElhaney, S. D. Schlotzhauer, F. G. Taylor, and R. R. Turner. 1982. Mercury contamination in East Fork Poplar Creek and Bear Creek. ORNL/CF-82/257. Oak Ridge National Laboratory, Oak Ridge, Tennessee.

APPENDIX 1

CHRONOLOGY OF EVENTS RELATING TO S. B. GOUGH

Dec. 5, 1981	Gough brothers sampled.
Dec. 19, 1981 through Jan. 3, 1982	WVW on vacation.
Jan. 5, 1982	WVW started manpower/budget assessment for the Aquatic Ecology Section due to impending budget cuts.
Latter half of Jan.	SBG first mentioned sampling and possibility of a proposal to WVW.
Feb. 5 & 8	Phase III of SBG's performance appraisal. This was WVW's first mention to SBG (and to 11 other monthly staff during the period Feb. 1-Feb. 25) of manpower/$ problems and that SBG was at risk.
Feb.	Laboratory initiates prospective budget impact analyses in all divisions.
Mid-Feb.	WVW discovered budget problems with EPRI/LDB project and started remedial actions.
Feb.	SBG apparently started job hunting due to identified budget problems.
Latter half of Feb.	SBG again mentioned sampling and possibility of a proposal to WVW.

Code to People's Names:

SIA - S. I. Auerbach
SWC - S. W. Christensen
SBG - S. B. Gough
DER - D. E. Reichle
CRR - C. R. Richmond
WVW - W. Van Winkle
JCW - J. C. White

Feb. 24	WVW first talked with SWC regarding his replacing SBG as co-principal investigator on EPRI LDB project effective April 1, 1982.
March 2	SBG two-page summary finalized (Attachment 3 of his testimony), but not mentioned to WVW.
First half of March	ESD became aware of potential environmental position at Y-12 and WVW informed SBG.
Mid-March	SBG sent letter and resume to Y-12 ref. potential environmental position.
Week of March 22	WVW informed SBG that the probability of his being included in a RIF was better than 50:50. WVW had similar discussions with three other staff members.
March 29 or 30	SBG asked WVW to sign letter (see Attachment 7 of SBG's testimony).
March 31	WVW first mentioned SBG/Hg to DER.
March 31 or April 1	WVW asked SBG for further information on the sampling.
April 1	DER informed CRR of SBG/Hg situation.
April 1 or 2	SBG supplied additional information to WVW, and WVW again talked with DER.
April 12	SIA returns from two-week travel, and DER informs SIA of SBG/Hg situation.
April 13	SIA first phones USGS in Denver.
April 20	Meeting of SIA, CRR, WVW, and JCW to discuss SBG/Hg situation.
April 29	Supervisor's meeting with SIA, SBG, and WVW.
April 30	First meeting of ESD and Y-12 staff to design a Hg study.
May 4	ORNL announced VRIF program with cutoff date of September 1982.
June 1	SBG requested VRIF.
June 8	ORNL approved VRIF for SBG.
June 18	SBG left ORNL.

Dr. Stephen B. Gough
8 Norman Court
Fredericksburg, VA 22401
2 September 1983

Ms. Debbie Martin
Room B-374
Rayburn House Office Building
Washington, D.C. 20515

Dear Ms. Martin:

Enclosed please find the answers to the additional questions posed by the subcommittees investigating the mercury releases at Oak Ridge, TN (enclosed in letter dated 12 August 1983). Please also find a copy of the transcript sent me by Ms. Nancy Jeffery.

In accordance with the statement attached to the latter, I have penciled in corrections to typographical errors or to errors in spelling or transcription. None of the errors are major; most involve the absence of an obviously needed preposition (etc.), the addition of which does not change the meaning in the slightest but aids reading and provides grammatical correctness. I am not insisting that the changes be made; they are merely provided as a courtesy.

Due to a concern on the part of Dr. Dugan I have not provided additional testimony beyond the requested answers to the questions, despite an apparent ploy by ORNL officials to utilize my testimony in a dubious manner to prepare supplemental remarks for the record.

Please note that two attachments (unlabeled) accompany the answers and should be included as part of the record since they are integral to the provision of the information the subcommittees requested in their specific questions.

Sincerely,

Stephen B. Gough

Enclosures

Additional Questions for
Dr. Stephen Gough

1. Dr. Van Winkle's supervisor's report of the interview conducted with Dr. Van Winkle, Dr. Auerbach, and yourself quotes you as saying that you were "injudicious" in working outside the system. Did you subsequently think that it was wrong to use the USGS as the laboratory to analyze the samples; what did you consider as injudicious at that time?

2. Dr. Van Winkle's supervisor's report mentions that your actions constituted an "unintentional 'misdemeanor' and not a 'felony'." Were you informed at the time that your actions constituted a violation of the law or did you view this statement as an analogy to the severity of the action for which you were being reprimanded? Specifically, what did you believe you were being reprimanded for?

3. On page 10 of your testimony, you mention that funding for your EPRI Legionella Research Project was redirected to other projects within the Department of Energy. Was this funding obtained from EPRI or was it internally-generated DOE funding? If it is EPRI funding, why do you comment that "it may not be illegal?"

4. On page 7 of your testimony, you state that you were unaware of the Elwood Study from 1977 which indicated a mercury contamination problem in Poplar Creek. Later, on page 13, you state that you knew the mercury contamination information was "considered 'bureaucratically sensitive'." Why did you then involve an outside agency in analyzing the samples?

ANSWERS TO QUESTIONS OF GORE/LLOYD SUBCOMMITTEES OF 12 AUGUST 1983

1. During the interview I did state that I had perhaps misjudged the response of the 'system' and should have (ideally) informed management before sampling with the USGS. The apologetic tone was due to several very pragmatic reasons. First, I was genuinely sorry (and surprised) that the 'incident' caused so much alarm. Second, I knew Dr. Auerbach well enough to realize that an argumentative confrontation was fruitless. The advice of Dr. Van Winkle, Dr. Elwood and others (memos to file available) was to 'take the medicine' since a paternalistic response from Auerbach was expected (and later observed). A number of uncomfortable and undesirable things had happened by the time of the reprimand, and it seemed possible that my job could be immediately put in serious jeopardy if I did not appear penitent. Third, any possibility of convincing upper division management of the validy of my position depended, at that time, on their perception that they had had the last word. Fourth, I was more interested in the science than in the politics of the 'incident' and was willing to swallow my pride if it helped advance the former. I was very disturbed by the reaffirmation that the subject was 'bureaucratically sensitive' but felt I was in no position to effect a change in the politics.

If I had been led to believe that the sampling done with my brother would in ANY way compromise national security, it most certainly would never have been done. However, as I indicated in my testimony, I was specifically told, on several occasions, that the fact that mercury was in the creek was NOT a national security issue. This was first ascertained in 1978 and was reiterated after the December 1981 sampling. DOE has indicated that they will gladly provide me with a written statement indicating that no breach of security occurred and that there was no impropriety on my part. This has, in essence, already been done. Joe La Grone wrote me on 21 July 1983 to state that he had instructed Union Carbide to remove the reprimand from my personal work record and that ORNL management had complied. He further said: '....after looking into the matter further, I have concluded that such a reprimand was neither necessary or appropriate in connection with your sampling activities near the Y-12 Plant while an employee of the Laboratory.' (His letter is attached.)

Also, as indicated in my written testimony, it is a matter of interpretation whether anything was really done outside the 'system.' Only my line management was informed of the sampling and of the results of the analyses. Even though I was well aware that I could have 'gone public' with a 'scandalous' story at any time, I felt it was appropriate to work within the system to the fullest extent possible. It was not until I left ORNL, over six months after the sampling, that I told an 'outsider.' Since that person was with the Office of the Inspector General of DOE, he too was a part of the system. My brother, and the USGS at large, had no plans to use the data for any purpose other than for the preparation of a proposal for DOE's consideration. While he obviously recognized the implications of the mercury data, my brother also felt my line management should be utilized as much as possible to effect any desired changes. No USGS personnel ever disclosed these data to unofficial recipients. The USGS was, however, dismayed by the handling of the incident by Auerbach, et al. and stated they would not perjure themselves to protect Union Carbide should someone request information. The reasons for their compliance with Dr. Auerbach's instructions for the return of the samples/data is discussed in the written testimony; they had little choice but to comply. It is my understanding that they were astounded that Auerbach specifically instructed them to not send a cover letter or to otherwise keep any records.

2. Dr. Van Winkle (the writer of the report) and I both viewed this in a non-legal sense. In a draft of the report the words 'misdemeanor' and 'felony' were not in quotes. While I was reasonably sure of Van Winkle's meaning, I asked him specifically if he was referring to the situation in a legal or colloquial context. If it was the latter, I suggested that the proper form would be to place the items in quotes or use different words (copy of draft available). At no time did anyone suggest that my brother or I had broken the law. Furthermore, as I have pointed out, we were informed that the issue was not sensitive from a national security standpoint. As a holder of a Top Secret clearance with responsibilities for the security of items which are very legitimately classified, I am well aware that specific procedures must be followed if a breach of security occurs, even if it is inadvertent/unintentional.

Perhaps the most convincing action which indicates the issue was not a national security item (or legitimately classified under any other sensitivity catagory) is the request by Mr. Joe La Grone, Manager, DOE Oak Ridge Operations, to have the reprimand removed from my file because it 'was neither necessary nor appropriate.' Mr. La Grone further stated, in an interview with the Oak Ridger, that my management had 'overreacted' in conferring the reprimand and he viewed my actions as beneficial. It should be noted that upper management within Union Carbide (at ORNL) readily complied with his instructions for the removal.

It now appears likely that Auerbach was either specifically told by his superiors to reprimand me, or that he felt it was what they would have wanted, since he has recently stated 'I cannot fault Dr. Gough's motives....nor his concerns over the actions subsequently taken'. '..... recognizing the sensitivity of the Y-12 facility.....it was necessary for me to take some administrative action.' He further says 'It would seem entirely appropriate for the Department of Energy to apologize to Dr. Gough, the Environmental Sciences Division, and to the public.....' Auerbach indicates in this letter that the reprimand was for exercising 'poor judgement' (from the Supervisor's Report, in failing to recognize 'bureaucratic' sensitivity, or the potential economic and sociological ramifications of the issue), as opposed to a 'reprimand for insubordination,' or some graver offense (ref. letter from S.I. Auerbach to Philip H. Abelson, Editor, Science Magazine, 27 July 1983; copy available).

It is disturbing to see 'national security' still being used to attempt to justify actions which were inappropriate. If national security was an issue to Auerbach, it is not clear why he did not mention it to me at any time (especially at the reprimand). It is also not clear why he did not provide insight into his own failed attempts to persuade the bureaucracy.

Thus, I believed then, as I do now, that I was reprimanded for inadvertently creating a political 'problem' within Union Carbide (and possible DOE). Concealment of the extent of the contamination was apparently perceived to be in jeopardy, and it was felt that any 'leaks' could cause sociological and economic impacts (Supervisor's Report), including, possibly, embarrassment to certain individuals. Having perceived such a political climate, beginning when I told Van Winkle about the sampling (January) and steadily increasing thereafter, I considered consulting with a higher authority within Union Carbide. This was judged to be a futile effort since the bureaucratic ramifications of the incident ultimately climbed to the top of the management ladder (or close to it). Similarly, a lack of support by my management for the preparation of a proposal to study the issue left me little choice but to abandon my research plans. My brother likewise felt the Oak Ridge bureaucracy had stifled any chance to conduct the study. Likewise, I felt it was inadvisable to air any complaints outside of Union Carbide. Since I had received threats from Van Winkle (e.g., re my brother's career; see testimony) I was very leary of consulting with anyone on the matter in the event there was any substance to the comments.

I did complain to the Personnel Department (James Atherton) on my day of resignation, but I never received word back from Union Carbide as to whether they had formally filed my complaint or otherwise taken any action. Dr. Auerbach chose not to conduct an exit interview.

Despite the severe reaction of management to the incident and my growing disillusionment with the organization, I was very interested in the Y-12 Environmental Coordinator's position. Until the time I was told I would no longer be considered for it (due to the mercury incident), I had hoped to stay in Oak Ridge--either in that position or some other one. Thereafter I actively sought another position outside Union Carbide. In May 1982 I interviewed for a position I had applied to in April. An offer was extended at the end of May, and I accepted. I then applied for a voluntary reduction-in-force severance, which was granted after I agreed to stay an extra week beyond the customary two weeks.

3. The funding for the EPRI project came from EPRI itself, not DOE. It is difficult for me to judge with certainty whether the funding redirection carried out by my management was illegal. I am told that it probably was, but that it would depend on the stipulations in the contract. For example, if all funds were returned to the account by a specified time, perhaps that is acceptable. During my tenure on the project, only some of the redirected funds were returned, and that was only done after I indicated that I felt the redirection was improper.

I have attached a memo dated 26 March 1981 which details a request for budget and accounting change. This memo instructs UCC-ND central accounting to transfer funds and was initiated by the Division Finance Officer (Carlos Brooks) at the direction of Van Winkle. This illustrates (1) some of the questionable accounting practices; (2) the fact that I questioned such practices; (3) the attitude management portrayed in response to my concern ('just grin and bear it'); and (4) the fact that I had no authority to change the action. Note also the justification that was used; viz, ".....Section Head inadvertently made the wrong internal time card charges." Other supporting documentation is available.

It is my understanding that the redirection of funds within a given broad work scope which is funded from the same source (e.g., DOE) is often done and may be proper. Due to a lack of total certainty regarding the use of the redirected funds, and not being privy to the accounting practices deemed proper under the contract, I cannot make a definitive value judgement. However, as I stated in my testimony, it was improper under any circumstances to blame me for financial problems caused by others (see testimony, p. 10).

4. Please reexamine p. 7 of my testimony; I DO NOT state that I was unaware of the 1977 Elwood study on fish data in the lower reaches of the East Fork and in the West Fork. I do state that I had difficulty obtaining the memo, but that I finally did. The information was vital to my assessment of mercury impacts around the K-25 site. Procurement of the document was done through standard managerial channels; my supervisor (then Dr. Robert Craig) acted on my repeated requests to see the memo (he indicated he had trouble convincing Mr. Jerry Wing, DOE, that it should be given to anyone). I DID NOT know about the 1977 mercury inventory data which was declassified in May 1983. Likewise, I was unaware of most of the memos relating to the mercury issue which are contained in the testimony of Drs. Auerbach and Richmond; most of these were unknown to me until the subcommittees' hearing.

Please note that I was told the information was 'bureaucratically' sensitive for the first time at my reprimand (see testimony, p. 13 ref. Supervisor's Report). Please also note that no definition for this was ever given, but the reprimand states concern over economic and sociological problems (testimony, Attachment 3). These words and other comments in the reprimand lead me (and many others) to conclude the concern was for public relations implications. Despite the fact that I was told about this sensitivity after the samples were taken, I would not have viewed the potential embarrassment of individuals due to exposure of a possible cover up a viable reason to not sample. Contrariwise, it could be construed to be morally remiss to drop the issue under such circumstances. Similarly, while I now feel that other individuals in ESD also attempted to call attention to the issue, they disappointedly appeared content, at the reprimand, to not continue to vigorously pursue such a goal (e.g., through DOE's Office of the Inspector General). It is also puzzling why they sought to chastise me if their own motives were similar to mine. If it was wrong, in their opinion, for me to delve into a bureaucratically sensitive issue, why was it not wrong for them as well?

One rationale put forth by Union Carbide management for disciplining me was that I did not work within the 'system.' However, my testimony amply demonstrates that I did not violate the system's trust (e.g, pp. 2,3). One very pragmatic illustration of the importance of the action, or similar activities to stimiulate the system, is the very fact that crucial information is now public and problems will be rectified as a result of the December 1981 work. Without it, the cover up would have continued. It is for these reasons that I agreed to cooperate with the Office of the Inspector General.

While I knew there was some sensitivity related to the mercury stream values when the samples were taken, I knew it was not due to national security (see testimony and answers above), and that it was unfounded. Since I do not believe in blindly following my supervision (I was charged with independent thought, like most researchers) I saw absolutely nothing wrong with the sampling and analysis we conducted. Out of courtesy, we were very careful not to indiscriminately mention our results. Thus, we did not even attempt to procure 'seed money' to continue our efforts (an action that could have shunted line management).

The involvement of an outside agency was not purposefully planned to embarrass management. As indicated in the testimony, my brother has specific expertise in the elemental content of plant tissue (botanical geochemistry). Much of the impetus to conduct the sampling came from my brother's interests. Like most researchers, he preferred to have his samples analyzed in his own laboratory, which he knew and trusted.

Contrary to what has been said by some, Dr. Larry Gough acted in an official capacity as part of the U.S. Geological Survey. While I provided insight into the local environment, the sampling and later anticipated proposal preparation relied heavily on his unencumbered involvement. After the overreaction of Union Carbide management, neither one of us could continue our efforts under a normal protocol. It should again be noted that informal interactions with scientists from other organizations is a normal part of business, and activities similar to ours are routinely carried out throughout government without any formal agreements to sanction them. Indeed the progress of scientific inquiry relies heavily on such spontaneous actions.

While some data were available to us before the sampling, we were apparently not privy to all information. In any event, data specific to the upper/middle East Fork, and data on plants (especially liverworts) did not exist. Some preliminary data of the type we collected were necessary to consider producing a credible proposal. For example, despite knowledge of the sediment concentrations downstream (public information contained in the K-25 EA), it was not possible to predict that the highest concentrations of mercury ever to be found in plants would be characteristic of the samples.

It was evident that the specific expertise possessed by my brother and me was not duplicated on the ORNL staff; we were asked several times by Van Winkle to supply information on the taxonomy of the plants involved, values for mercury in plant tissue from the literature, etc. He openly recognized the USGS Biogeochemical Laboratory as a pre-eminent facility for studies of the specific nature we proposed to undertake.

It should also be noted that it was widely acknowledged by several peers and managers, after the fact, that I would never have gotten permission to have the samples analyzed at a DOE/ORO facility. Some of my peers also indicated that the analytical methods used by Y-12 for mercury analysis were not always satifactory for critical scientific inquiry.

There was never any attempt to hide the sampling or the results from management. It happened that they were informed of the sampling a few weeks after it occurred, much as other items of similar perceived significance were stated in passing when the opportunity existed. No serious proposal preparation could be done until results were available; once the values were available the managerial reaction effectively blocked further proposal plans. Despite my stated interest in the topic of mercury in the creek I was only allowed to minimally participate in the frenzied follow up study in May by other ORNL staff. Further proof that the mercury was not seriously considered a national security matter can be found in the classification of the report from this study, i.e., Union Carbide 'Business Confidential.' Likewise, it was later released without the normal declassification protocol which is required for documents which are classified under national security regulations.

If indeed Auerbach, Van Winkle and others were under pressure from DOE or Y-12 to ignore a potential mercury problem in the creek I can understand why they would experience some discomfort with the knowledge of our sampling. Such discomfort implies a political problem. I would have been far more impressed if they had decided to keep the politics from reaching my level. This would have been more consistent with the level of concern regarding the contamination which they expressed in their testimony. Given my consistently good performance (as documented in my performance appraisals over the six-year period of my tenure) I , and many others, cannot help but conclude that the sampling directly resulted in my removal as co-principal investigator on the EPRI project and the fact that I was targeted for a RIF. As indicated previously, Van Winkle admitted to me and the press that I was removed from further consideration for appointment as the Y-12 Environmental Coordinator as a direct result of my sampling activities. Since no logical reason can be found for having considered the issue sensitive, one can only conclude that the political fallout caused my demise.

In summary, while I knew some sensitivity surrounded the mercury contamination, I knew the fact that mercury was in the creek had been made public via DOE documents (though little attention had been drawn to it). It was evident from this and other factors that the sensitivity did not involve national security; rather it was of an inappropriate political nature. Recognizing that political sensitivity could nevertheless constitute a reason for caution, no disclosure of the data outside of the immediate line management in ESD and the USGS was comtemplated at the time of sampling. Cooperative ventures of the type undertaken by me and my brother were, and are, commonplace in institutionalized science. As experienced researchers it was implicit that no prior permission was needed for the effort expended, particularly when no company time was used and no DOE supplies were used. No priviledged information was known by me that was not in the printed literature, except for the Elwood memo, which was used in preparing my analysis for the K-25 EA (which was public). Thus, if I had been an employee of a university and had a copy of the latter document I could have, without question, taken samples in the City of Oak Ridge and reached the same conclusions. Also, DOE itself has now ruled that our activities were not at all improper. In fact, we have been commended for them. Finally, our efforts are little different than those professed to have been done by Auerbach and others and touted by them as evidence of their concern.

I am optimistic that an enlightened attitude will prevail from now on in Oak Ridge. It seems likely that the advent of Mr. Joe La Grone will contribute greatly to new policies, which will foster a new era of open concern regarding issues heretofor considered sensitiive, albeit inappropriately. I also feel that other individuals who were suppressed will now feel free to speak with candor. Unfortunately, the revelation of a possible withholding of information by Union Carbide from DOE and the State on a recent spill of iodine-131 (ref. The Oak Ridger, 5 Sept. 1983) does not help promote the necessary public trust. However, what has been the mode of operation for many years will, of necessity, take some time to change. I feel confident that change will come and trust the subcommittees' actions will continue to promote it.

I would emphasize that I heartily endorse the classification of information which is legitimately sensitive. Likewise, I hope the new rules for 'unclassified controlled nuclear information,' if exercised, will be applied with due caution and in response to bona fide needs.

Department of Energy
Oak Ridge Operations
P.O. Box E
Oak Ridge, Tennessee 37830

July 21, 1983

Mr. Stephen B. Gough
7 Norman Court
Fredericksburg, VA 22401

Dear Mr. Gough:

This is in reference to our conversation in Oak Ridge on July 11, 1983.

On July 19, management at the Oak Ridge National Laboratory was advised that any written reprimand of you, related to your taking of environmental samples near the Y-12 Plant in December of 1981, should be removed from your personal work record on file at ORNL. The request was made because after looking into the matter further, I have concluded that such a reprimand was neither necessary nor appropriate in connection with your sampling activities near the Y-12 Plant while an employee of the Laboratory.

ORNL management has agreed to removal of the reprimand from your record. I wish you well in your future endeavors.

Sincerely,

Joe La Grone

Joe La Grone
Manager

W.V.W.

REQUEST FOR BUDGET AND ACCOUNTING CHANGE

Date March 26, 1981

Change No.

File

Accounting Change

☐ Open Special Job Order (Capital, Unusual Cost, Special Expense, Work for Others)
☐ Close Special Job Order
☐ Open Program or Operating Account (Limit Title to 30 Characters)
☐ Close Program or Operating Account (Executing Division to Close Work Orders)
☒ Transfer of Costs (Detail as Appropriate *)
☐ Other:

Budget Change

☐ Change DOE Activity No.
☐ Change Internal Code No.
☐ Change DOE 189 No.
☐ Revise Budgets
☐ Revise Account Description and/or Percentage Distribution
☐ Other:

* Labor (Source Account, Hours and Dollars), Material, etc. — Account and Type Expense to be Debited and Credited.

Description of Change and/or Special Instructions:

Effective immediately, please transfer the following as material cost:

Description	Amount	Debit	Credit
Material	$24,266	338066-0010	338066-0262
		338066-0760	338066-0262
		338066-0257	338066-0262
		338066-0103	338066-0262
		338066-0760	338066-0262

Justification for Change:

Although the costs involve labor and overhead, I request the above changes be made as a material transfer because the stated amount of dollars ($24,266) was the actual cost involved. The amount represented the total hours by account as follows:

Source	Hours	Amount
3380 M	184.0	$6,250
3380 M	184.0	6,250
3380 M	92.0	3,125
3380 M	184.0	6,250
3380 M	76.0	2,291
	720.0	$24,266

WVW ↳ vs $55 K

Comments:

An audit would surely take issue with this SDG.

* 30K loss — seems like a lot to put up with. Questionable fiscal (accounting) procedure! SDG 2. April. 1981.

Account Budgets:

The above action is necessary to correct a mistake which occured in December, FY 1981, when a Section Head inadvertedly made the wrong internal time card charges.

WVW → Just grin + bear it. Great!?! * Wait later paid & would get the other 30K back eventually.

DIVISION NAME ESD

CODE NUMBER (42)

REQUESTED BY Carlos B. Brooks

APPROVED BY

DISTRIBUTION OF COPIES:

1-2 Budget and Accounting, Bldg. 4500
3 Requester
4 Executing Divisions Holding Work Orders
5 Other:

55/

UCN-2028 13 9-78

MICHIGAN STATE UNIVERSITY

INSTITUTE OF WATER RESEARCH
NATURAL RESOURCES BUILDING

EAST LANSING · MICHIGAN · 48824

August 18, 1983

Ms. Debbie Martin
Room B-374, Rayburn House Office Building
Washington, DC 20515

Dear Ms. Martin:

Representative Albert Gore, Jr. and Marilyn Lloyd requested that I provide the following information to supplement the record of the July 11, 1983, hearing on the Impact of Mercury Release at the Oak Ridge Complex.

QUESTION 1, PART 1.
Could you briefly summarize your background in chairing a National Academy of Science panel on mercury issues?

When mercury contamination was discovered in Lake St. Clair in 1970 I testified before a Senate subcommittee chaired by Senator Phillip Hart regarding the likely impact on the environment. Then I was asked to write a review of the research to date on the mercury problem for a subcommittee of the Michigan House of Representatives chaired by Representative Joseph Snyder. This report, entitled The Environmental Mercury Problem was subsequently published by the Chemical Rubber Company. I also published another book, Mercury Contamination, with P.A. D'Itri, as well as numerous articles in various scientific journals which must have prompted the selection committee from the National Academy of Science to invite me to chair their panel on An Assessment of Mercury in the Environment in 1977.

QUESTION 1, PART 2.
Would you summarize your discussions with Dr. Clarkson, who was earlier involved in studying the mercury question for the Department of Energy?

As Dr. Clarkson and I have both been studying the mercury contamination problem for many years, we have both presented papers and responded to questions at many of the same conferences. The dates of some of these are listed below.

1970	University of Michigan, MSU Conference, Ann Arbor, MI
1973	Vanderbilt University Conference, Nashville, TN
1975	Fisheries Conference, Kenora, Ontario
1977	Lavel University Conference, Quebec City, Quebec
1980	Berry's Creek Workshop, New Jersey

In 1983 I reviewed a preliminary draft of a Mercury Assessment Report prepared by Dr. Clarkson for the Environmental Criteria and Assessment Office of the U.S. Environmental Protection Agency, Research Triangle Park, North Carolina. I have had no discussions with Dr. Clarkson concerning whatever he did for the Department of Energy.

QUESTION 2.

Do you have any suggestions which are not being implemented by the DOE for monitoring mercury levels?

I have not seen the Department of Energy's monitoring program. Therefore, if you would like me to comment on it, please provide me with a copy. However, I would like to stress that monitoring must be perceived in a framework that eliminates future environmental contamination and cleans up what has been despoiled previously. Therefore, monitoring must be supported by regulation and enforcement.

If you have any further questions concerning this matter please write or call me at (517) 353-3744.

Sincerely,

Frank M. D'Itri

Frank M. D'Itri
Professor of Water Chemistry

LEGAL ENVIRONMENTAL ASSISTANCE FOUNDATION
CENTRAL APPALACHIAN OFFICE
602 GAY STREET, SUITE 507 • KNOXVILLE, TENNESSEE 37902 • 615-637-5172

August 24, 1983

Ms. Debbie Martin
Room B-374
Rayburn House Office Building
Washington, D.C. 20515

Dear Ms. Martin:

We sincerely appreciated the opportunity to testify at the hearing on July 11 in Oak Ridge. We are pleased that some progress is being made in assessing the environmental problems at the Y-12 facility. Below are LEAF's answers to the supplemental questions posed in the letter of August 12, 1983, from Representatives Gore and Lloyd.

Answers to Additional Questions for the
Legal Environmental Assistance Foundation

1. We are not now aware of any member of the general public who has become sick because of the mercury discharges. However, noone has really begun looking for the symptoms of low-level mercury poisoning, which are often masked as learning problems or nervous disorders, in the potentially exposed population. One of LEAF's requests at the hearing was for the commissioning of an epidemiological study of residents who were potentially exposed to elevated levels of mercury over the last 30 years.

The purpose of the reference to Minamata was to put the magnitude of the mercury releases from Y-12 into perspective. At Minamata there were approximately 800,000 pounds of mercury released into the Bay. At Y-12 there were at least 470,000 pounds released directly into East Fork Poplar Creek, with 1.5 million pounds more potentially in the environment available for contaminating ground water and surface waters. The environmental fate of all this mercury still has not been determined. By pointing this out we intended to show that DOE's public downplaying of the problem was premature.

2. On page 5 of DOE's Mercury Inventory Report from June 7, 1977, released to the public on May 17, 1983, there are estimates of creek losses. The following figures appear on that page:

Creek losses through 1972 (soluble)	235,000 lbs.
Creek losses through 1964 (entrained, estimated)	235,000 lbs.

The follwing note also appeared with these figures:
"No analysis available on entrained material. Estimated to be equal to souluble mercury."

Also, in a December 22, 1982, letter from J.F. Wing, DOE, to Earl Leming, TDHE, DOE provided data on historical mercury concentrations in the water of East Fork Poplar Creek. During ther years, 1956, 57, 58, and 59, levels of soluble mercury in creek water were very high (as high as 14.5 mg/l in 1958) indicating discharges of large quantities of soluble mercury.

3. One of LEAF's chief concerns is that there is as yet no binding compliance schedule for the cessation of hazardous waste practices at Y-12 that are in violation of hazardous waste laws. LEAF recognizes that a permanent solution to the waste disposal problem at Y-12 will take time, but there are measures that DOE could take immediately to avoid the continued contamination of the environment without having to shut down the facility. For instance, DOE has recently "discovered" a unit in the K-25 facility that is capable of detoxifying wastes that are now dumped into the S-3 Ponds at Y-12. This unit should be brought on line as soon as possible and the wastes should be stored until then.

There are also "off the shelf" treatment systems that can be brought in very quickly to treat these wastes. Engineering journals abound with advertisements for systems to treat these relatively easy-to-treat wastes.

Some industries generating similar wastes in the Southeast are paying to have their wastes trucked to South Carolina or Alabama for legal disposal in hazardous waste landfills that are licensed under RCRA. There is also a facility in South Carolina that is licensed to accept low level radioactive wastes for those chemical wastes that are contaminated with radioactivity. The volumes of mixed chemical and radioactive wastes can also be reduced greatly by segregation of these wastes at the source.

Most of these immediate solutions will require the expenditure of money and will be relatively expensive compared to the short-term costs of continuing to dump wastes as they are now being dumped. However, when the costs of these solutions are compared to the costs of cleaning up the mess that has been and is still being created by the illegal dumping, these solutions will be found to be bargains.

4. The information we had in the preparation of the testimony

was from a letter sent to James Holdaway of EPA, Region IV, from J.F. Wing, DOE, on January 19, 1976, which stated in regard to the central pollution control facility:

> A project for the alternate treatment of most of these waste flows was proposed as a fiscal year 1976 project and submitted in November 1973. After it was determined that ERDA could not support this project over other priority budget items, the proposal for the facilities was moved to fiscal year 1980 in the Y-12 budget as part of a larger and broader treatment project to the meet the potentially more restrictive 1983 requirements.

According to a recent article in the Washington Post(Front page, August 17, 1983), Congress first appropriated money for the design of a Central Pollution Control Facility at Y-12 in FY 1978. In FY 1982 Congress appropriated $4 million to build the facility, but the money was used elsewhere by DOE. The article quotes Joe LaGrone, the Oak Ridge Operations Manager, as saying, "The dollars were pulled back and essentially used elsewhere."

5. One of the chief criteria for a "public interest representative is that he or she have no financial ties to the DOE or its contractor. In order to be able to contribute to the work of the Task Force he or she should be able to understand the technical issues that will be brought to the Task Force, or should have access to consultants who can assist with these issues. A community resident would certainly be preferable, but most importantly, the community and citizens groups that have been involved and concerned with these problems should select the person to represent them. Also very important is that this representative should be compensated for the time spent in meetings and reviewing reports and for consultant assistance. This is the only way that a person not on the payroll of a government agency can participate effectively.

Thank you for this opportunity to respond to these supplemental questions.

Sincerely,

Dean Hill Rivkin
Board Member of Legal Environmental
Assistance Foundation

Gary A. Davis
Counsel for Legal Environmental
Assistance Foundation

ATOMIC TRADES AND LABOR COUNCIL
AFFILIATED WITH METAL TRADES DEPARTMENT AFL-CIO
P. O. BOX 366
OAK RIDGE, TENNESSEE 37830

September 7, 1983

Ms. Debbie Martin
Room B-374
Rayburn House Office Building
Washington, D.C. 20515

Dear Ms. Martin:

Hearing on the Impact of the Mercury Releases at the Oak Ridge Complex

In their joint letter of August 12, 1983, Representative Albert Gore, Jr. and Representative Marilyn Lloyd asked that I address my response to four questions not asked at the July 11th hearing to you. The four additional questions and my response to each are as follows:

1. We have been advised that the average urinalysis mercury levels for all workers in 1955 never exceeded the recommended limit of .3 mg/l. Have you any comment on this statement?

   I think the key word in this statement is "average". While this may be a true statement, it does not reflect how many workers exceeded the limit of .3 milligrams per litre. Also, I do not know if "all workers" refers to the total plant population or all the workers with mercury exposure. The statement is limited to one year, 1955, and workers were exposed over a several-year period.

   As stated in lines 6306 and 6307 of my testimony, many workers do not recall being on a urine sampling program and, thus, would not be a part of the statistics.

2. What is your view of Dr. Bell's (NIOSH) study which reviewed the Y-12 data on mercury worker exposure? As we understand it, none of the 23 employees of the 50 selected showed any symptoms of mercury poisoning. We would also be very interested in whether you have any data at variance with the mortality study done by the Oak Ridge Associated Universities on the Y-12 mercury worker population.

   I, nor any other office of the ATLC, was not aware of the NIOSH study by Dr. Bell in 1974 or the ORAU mortality study until the congressional hearing was held in Oak Ridge on July 11, 1983. I have since discussed the studies with officials of Union Carbide and obtained a copy of the ORAU study by request on August 29, 1983.

The NIOSH study in 1974 on 23 employees represents less than 1% of the employees involved with mercury exposure. I do not believe that this study provides conclusive data. The company officials advise me that these employees were selected on the basis of high urinalysis readings for mercury content. Again, we are concerned about employees who were not on urine sampling programs.

I do not have any data at variance with the mortality study by ORAU on the Y-12 mercury worker population, but the exclusion of more than a third of the monitored workers (970 of 2,452) and the reasons for the exclusion seem questionable.

The ATLC plans to survey our membership to ascertain the number who worked with mercury, the number who were on urine sampling programs, and possible variance with the information presented to date. The survey form has been submitted to the company for classification and security review before being distributed to the workers, but I have not received a reply as yet.

3. Are there any specific studies you can identify which go beyond these medical studies which have already been conducted by DOE, ORAU and NIOSH?

The last paragraph of the ORAU study states:

> Smith et al, 1973, have shown, however, that TWA concentrations of mercury vapor correlate more strongly with symptoms of poisoning than levels in urine. Urinalysis values, which correlated strongly with the TWA, were felt to be indicators of employee exposure but not predictors of development of symptoms.[6]

I have not read the study by Smith, et al., but I believe it should be considered since, as I stated in my testimony on July 11, many of the Y-12 workers were exposed to mercury vapor without protection of respirators.

4. I do believe that points 5 and 6 of your survey elements are important and I would appreciate any suggestions for protective measure monitoring which you have which the Committee might recommend to Mr. LaGrone.

I request that 24-hour air monitoring be conducted at all facilities where mercury is still present or is still being used. Daily records, including the time period worked, should be kept on all employees who enter or work in these buildings. Respirators whould be required for all workers who may be subjected to mercury vapors. All employees working with mercury or in an area where mercury is used should have urinalysis sampling and any other appropriate diagnostic tests as part of a carefully structured monitoring program.

Please express my appreciation to Representative Gore and to Representative Lloyd for their interest in the mercury problems and for asking me to participate in the hearings. I shall be happy to be of any assistance that I can in the future.

Sincerely,

Robert G. Keil

Robert G. Keil
President

RGK:jak

cc: File

Additional Questions for
Dr. Charles Coutant

1. Do you believe that the expertise at ORNL has been made available to the Oak Ridge community to fulfill its need to assess the extent of the mercury problem and its potential environmental impacts?

2. On page 2 of your testimony, you mentioned that highly contaminated creek sediments were used as top soil for a sewer relocation project. Were the creek sediments you referred to from East Fork Poplar Creek? Where in the city was this soil used, and what are the ramifications of such use?

3. You mentioned on page 2, at the bottom of the page, that certain soils that received East Fork Poplar Creek top soil had high concentrations of total mercury. What other soils have received creek top soil other than that used for the sewer relocation project that you mentioned?

4. On page 3 of your testimony you mentioned that "Oak Ridgers would most likely receive the highest intake rate from eating fish from East Fork Poplar Creek." What edible fish can be found in East Fork Poplar Creek? Do mercury contaminated fish look any different than uncontaminated fish?

5. On page 3 you mention that edible plants raised in gardens have a low uptake of mercury. To your knowledge has any dredge material from East Fork Poplar Creek been used as garden soil?

6. Was any mercury in the meat and tissue sample from Oak Ridge steer below Food and Drug Administration guidelines? If so, about how much lower was it?

7. Has DOE been cooperative with the Board in assessing the health impacts of the mercury contamination?

8. What role will the Board play in the future relative to the mercury contamination?

9. Please include for the record a short statement of your current duties and position at ORNL.

MR. COUTANT INCLUDED A MAP OF THE OAK RIDGE WASTEWATER TRANSMISSION FACILITIES WITH HIS RESPONSES - THE MAP IS ON FILE AT THE SUBCOMMITTEE OFFICES.

RESPONSES TO ADDITIONAL QUESTIONS

By

Charles C. Coutant

1. No, I do not. ORNL expertise in pollution problems, especially expertise related to movement of contaminants in the environment, was not applied to its potential to resolve the Oak Ridge contamination problems (especially from Y-12) in the past nor is it now.

In the past decade ORNL overtures to the Oak Ridge Operations Office of AEC/ERDA/DOE regarding the need for comprehensive studies of toxicants and other Oak Ridge impacts were generally rebuffed, and those studies which were authorized were severely constricted by time limits, limits to number of samples, and limits to allowable sampling sites, and as we all now know, the results of even these attempts were held from the public. While only this minimal level of environmental assessment was allowed on our doorstep, ORNL expertise was at the forefront of thorough contaminant evaluation and research at the Almaden mercury mines in Spain, at the Saltville chloralkali plant in Virginia (which contaminated the North Fork Holston River deep into Tennessee), at a lead smelter in Missouri, and at several sources of metal contamination from power station discharges (mostly fly ash). ORNL's methods of analysis (including mathematical modeling) for metals in the environment were recognized by the EPA with the result that the laboratory was asked to prepare predictive mathematical models for toxicant transport for use by the EPA Office of Toxic Substances in regulating new chemicals. These analytical methods remain unused for the Oak Ridge mercury spill and evaluations of other contaminants.

In my somewhat awkward position as a number of the Environmental Sciences Division of ORNL and the Chairman of the City's Environmental Quality Advisory Board, I can see abundant, relevant expertise lying dormant at ORNL. This situation was first due to the policies of the Operations Office; now it is due to the discredit which those policies have brought to the scientific credibility of all Oak Ridge staff in the eyes of the public and regulatory agencies. No study yet attempted or proposed for the Oak Ridge area in the wake of the mercury revelations even approaches the comprehensiveness with which ORNL evaluated (and published in the open literature) mercury contamination in Spain or at Saltville. Your question might be answered simply by noting how many of the ORNL research staff who have a record of scientific publication in the area of mercury and other toxicants in the environment are serving on the interagency task force. None.

2. Contaminated sediments were dredged from East Fork Poplar Creek in the vicinity of the Jefferson Avenue - Oak Ridge Turnpike intersection (near the city tennis courts, and at a point where the creek passes under the Turnpike) and were used as topsoil for the sewer relocation project. The accompanying map outlines the areas which received this material.

From the standpoint of physical dispersal, the relocation of creek sediment greatly extended the distribution of all contaminants beyond the zone where natural processes (washing downstream) would have taken them. Some sediment was used in another watershed (the east end of Oak Ridge). The dispersal also relocated the contaminated material to sites of human contact - street margins and school zones - which would not otherwise have been in a pathway of contamination. The possible biological impact of the mercury at these new locations is still under discussion, but there seems to be no imminent health hazard providing care is taken to avoid extensive body contact, breathing of contaminated dust or eating vegetation from the sites (activities not normally associated with the areas covered with the sediment).

3. I was referring here to the sewer relocation sites. However, numerous Oak Ridgers have used soil from the floodplain of East Fork Poplar Creek as an additive to home gardens. Much of the floodplain is undeveloped land with informal access roadways. The floodplain at the West End Sewage Plant traditionally served as a disposal site for leaves and sewage sludge accumulated by the city, and both of these materials were collected (after they had decomposed) by gardeners as soil amendments. The rich creekside soil was often taken along with leaf mulch and sludge. There is no way to determine how much soil was removed by how many gardeners and to what areas. At the sewage plant, however, sludge, leaves and rich soil disappeared.

4. My statement was based on the understanding that, among most human foods, fish flesh has been found repeatedly to be the most likely to carry a high concentration of mercury (usually methyl mercury) derived from waterborne contamination. Our principal source of reference has been the National Academy of Sciences Study. East Fork Poplar Creek contains small bluegill (the most popular sport fish in the country for children according to fisheries managers), some other members of the sunfish family, and largemouth bass in the lower reaches of the creek. It is both conceivable and likely that some youngsters would fish for bluegill ("bream") in the creek. I have personally seen kids with fishing poles walking along the creek. In early years in Oak Ridge I advocated expanding this use with "juvenile fishing ponds" which could be created where the creek passes through potential parkland (a practice which has been successful in other cities including Oak Ridge's sister city, Richland, Washington). Contaminated fish look and act no different than uncontaminated fish at the levels of mercury found in fish from East Fork Poplar Creek.

5. To my knowledge, no material dredged from the creekbed itself has been used in gardens. Rather, it has been creekside soil that has been used (this floodplain soil is, however, also contaminated). There may have been gardeners who took the relatively rich, sandy creek sediment material from piles at the creekside before it was used to cover the sewer project. I recall being tempted to do so myself.

6. The data on mercury in meat and other tissues of a steer that had been pastured in the floodplain of East Fork Poplar Creek showed

concentrations much below those believed hazardous by the Food and Drug Administration for edible flesh such as fish (that is, the levels were not high enough to cause concern). The actual levels were released to the public by DOE, in a memo of June 21, 1983 (copy attached).

7. The Board has evaluated the health impacts of mercury contamination through independent sources. DOE now chooses to offer no assessments of data, and it now relies upon the Interagency Task Force to develop an assessment program which would evaluate the data. DOE has been highly cooperative in providing chemical analyses for any material given to it ad hoc by Oak Ridge citizens (through the city staff).

8. The Enviornmental Quality Advisory Board anticipates a continuing role in overseeing the progress of study, evaluation and mitigation. Through a city staff representative on the Interagency Task Force we are keeping abreast of the Task Force's developing plans and we have passed on certain suggestions to them. We expect to be a citizen voice to stimulate action. We are independently evaluating all data made available through the Task Force. Should the Task Force actions not be judged appropriate, we would anticipate making our own recommendations to the Oak Ridge City Staff and Council.

9. My current position is a Senior Research Staff Member in the Aquatic Ecology Section of the Environmental Sciences Division, ORNL. I am presently acting as the lead fisheries biologist for evaluations of environmental impact of the Susitna Hydroelectric Project in Alaska, a study being conducted for the Federal Energy Regulatory Commission. Part of my time is devoted to development of new research programs for the Division. In the recent past I have been a team leader responsible for an EPA project on modeling of transport of contaminants in the environment, and was Program Manager for ORNL's research on effects of power plant cooling an aquatic ecosystems (publications are still being prepared on research and analysis in these areas).

For reference
Not To Be Taken
From the Room
[illegible]

Department of Energy
Oak Ridge Operations
P.O. Box E
Oak Ridge, Tennessee 37830

June 21, 1983

Those on Attached List

Gentlemen:

TRANSMITTAL OF ENVIRONMENTAL SAMPLING DATA FOR MERCURY

DOE has continued to generate data relating to mercury levels in the City of Oak Ridge environment. Our second submittal is incorporated with this letter.

Enclosed is a report of sampling by the Oak Ridge Associated Universities (ORAU). Soil, surface water, and sediments were sampled and analyzed. An analysis of potting soil, as a control, was performed also.

DOE has also recently obtained data on mercury in cattle from various locations within the city that was developed in November 1982.

A cow which had been slaughtered and was known to have grazed along East Fork Poplar Creek had several of its organs and tissues analyzed. The resultant mercury data on a fresh "wet" weight basis is:

Kidney 0.05 microgram Hg/g flesh replicate 0.08 microgram Hg/g flesh

Muscle <0.01 microgram Hg/g flesh

Liver 0.03 microgram Hg/g flesh replicate 0.03 microgram Hg/g flesh

Brain <0.01 microgram Hg/g flesh

Hair <0.1 microgram/g

Samples of hair were taken from an additional cow and two horses which graze along East Fork Poplar Creek. These hair samples all showed less than 0.1 ppm mercury. Hair samples were also taken from a cow and a horse from the ORAU's Comparative Animal Research Laboratory (CARL). These animals had never grazed along East Fork Poplar Creek or on any land contaminated with mercury. The CARL animal hair samples contained less than 0.1 ppm mercury. The data from the CARL animals underscores that the East Fork Poplar Creek animals did not contain abnormal levels of mercury. //

If you have any questions about this information, please contact Gabe Marciante of my staff at (615) 576-0850 or (FTS) 626-0850.

Sincerely,

J. F. Wing

J. F. Wing, Chief
Environmental Protection Branch
Safety and Environmental Control Division

SE-331:GJM

Enclosure:
Mercury Data

cc w/encl:
Oak Ridge Library
✓R. B. Nicholas, Cong. Staff
✓J. V. Dugan, Cong. Staff

Enclosure

MERCURY DATA

At the request of the DOE, ORAU has collected and analyzed samples of soil and water for mercury

Scarboro Community

1. Water (parts per billion)

LOCATION	DATE COLLECTED	SAMPLE	RESULTS
250' upstream Spellman Avenue	6/14/83	83-0067	<0.05 ppb
200' west of Dillard Avenue	6/14/83	83-0071	<0.05
300' west of Tuskeegee Drive	6/14/83	83-0075	0.05
30' north of Tusculum Drive	6/14/83	83-0079	<0.05

2. Soil (parts per million)

6' from creek (83-0067)	6/14/83	83-0069	0.40 ppm
20' from creek (83-0067)	6/14/83	83-0070	0.10
6' from creek (83-0071)	6/14/83	83-0073	0.15
30' from creek (83-0071)	6/14/83	83-0074	0.80
10' from creek (83-0075)	6/14/83	83-0077	<0.05
100' from creek (83-0075)	6/14/83	83-0078	<0.05
10' from creek (83-0079)	6/14/83	83-0081	0.05

Greenview Estates, small garden

1. Soil

South edge of house	6/8/83	83-0031	8.0 ppm

Potting soil, as a control

1. Soil

planter box	6/7/83	83-0025	<0.01 ppm

Greenview Estates, East Fork Poplar Creek

1. Sediment

100' upstream of Turnpike bridge	6/8/83	83-0039	39 ppm

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV
345 COURTLAND STREET
ATLANTA, GEORGIA 30365

SEP 19 1983

Ms. Debbie Martin
Room B-374
Rayburn House Office Building
Washington, D.C. 20515

Dear Ms. Martin:

This is in response to the recent letter from Congressman Gore and Congresswoman Lloyd requesting a supplement to the record of the hearing held on July 11, 1983, at the Oak Ridge complex, Tennessee.

I have responded to the questions in the order indicated in the enclosure of this letter. Please let me know if you have additional questions.

Sincerely yours,

Howard Zeller

Howard D. Zeller
Assistant Regional Administrator
for Policy and Management

Enclosure

1 Q. Are you satisfied with the progress of negotiations with DOE in terms of achieving environmental compliance for facilities at the Oak Ridge National Laboratory, the Gaseous Diffusion Plant, and those used for other DOE activities?

1 A. In general, the Environmental Protection Agency is well satisfied with the progress achieved on the negotiations with the Department of Energy in terms of achieving environmental compliance at the Oak Ridge complex. The Memorandum of Understanding (MOU) developed for the Y-12 is progressing satisfactorily. All of the dates have been met, or exceeded, by the Department of Energy that have been set forth in the MOU. A draft permit for the Gaseous Diffusion Plant (K-25) has been prepared and is being discussed with the State at this time. We expect to issue the permit immediately following certification, or approximately 45 days from the date of certification. Compliance evaluation inspections have been made at the Oak Ridge National Laboratory and the Oak Ridge Gaseous Diffusion Plant. Final results of these inspections are being evaluated. An appropriate plan of action for the necessary environmental controls at these facilities will be developed in a timely manner.

2 Q. In a variety of correspondence with the Department of Energy we have noted that, for example, the State is chiefly interested in flow data of effluent streams undiluted. Isn't the important fact here that, whether diluted or not, we know the concentration of pollutants in state streams where aquatic life feed or which serve as sources of drinking water? Since the Industrial Ditch leg of the East Fork Poplar Creek owes its existence chiefly to runoff of 6 million gallons per day of Y-12 water, is there not some question as to whether this stream is a state waterway?

2 A. The concentration of pollutants in streams is important in determining impacts on aquatic life and public drinking water supplies as you have indicated. The Industrial Ditch leg of the East Fork Poplar Creek, although it primarily receives runoff from the Y-12 facility, also has small contributions of spring water, ground water and surface drainage in the area above the Industrial Ditch and establishes a natural flow in the bed of the creek before the discharge of wastewaters. It is my opinion that these flows clearly establish "waters of the State of Tennessee and waters of the United States" as defined by the Clean Water Act.

As I indicated above, concentrations of pollutants are important in determining impacts on the receiving stream. However, the Clean Water Act and subsequent regulations that have been promulgated are specific in requiring point source controls on permits to limit the poundage of the pollutants discharged. The success of the NPDES permit program can clearly be attributed to the effluent limitations which are required on discharges. Varying requirements for levels of treatment that are "best available treatment" or "best practicable treatment" are established by the regulations. All discharges must meet water quality standards. It is also important to point out that dilution of a pollutant to reach an acceptable concentration in a receiving stream can cause serious problems due to the ability of organisms to bioaccumulate at a very low concentration.

3 Q. In what ways, if any, has DOE been operating a waste management program not "substantially equivalent" to RCRA? Are there any areas in which Oak Ridge is virtually unique among all Region IV facilities in terms of waste management techniques?

3 A. Because of the exemptions from the RCRA regulations which the Department of Energy (DOE) has claimed, the Environmental Protection Agency (EPA) has not evaluated DOE's waste management program to determine if it is "substantially equivalent" to RCRA. Only now, as a part of the MOU with DOE, is EPA beginning to obtain information about DOE's waste management program. From the information we have seen to date, we do not believe DOE's waste management techniques at Oak Ridge are particularly unique when compared with other industrial facilities in our Region.

4 Q. Could (and how could) EPA require DOE to take a remedial action under the MOU if DOE did not consider such action "appropriate"? Under the present framework, does Region IV have the technical expertise necessary to evaluate DOE's choices for the remediation? Would an independent peer review panel help EPA in this important area?

4 A. I cannot visualize that either the State of Tennessee or EPA would request the Department of Energy to perform a remedial action that would be considered "inappropriate". In the event that would occur, EPA would use Section 1-6, Compliance with Pollution Control, or Executive Order 12088, to resolve the conflicts. As I have indicated in previous testimony, the MOU which has been developed provides a positive guideline for cleanup at Oak Ridge.

At the present time, I believe that Region IV of the Environmental Protection Agency has the technical expertise necessary to evaluate DOE's choices for environmental remedies. I do not believe that an independent peer review panel would contribute significantly to a resolution of any problems that might develop.

5 Q. What will the revised NPDES permits contain and not contain? Will DOE provide all the data itself in support of the legal parameters? Will EPA conduct compliance inspections? On what schedule? What concentration and loading guidelines, in general, will EPA require DOE to adhere to? Does Region IV have the enforcement resources necessary to ensure compliance with NPDES requirements?

5 A. The revised NPDES permits will contain discharge limitations for all significant pollutants in the wastewaters being discharged to waters of the State of Tennessee. Special emphasis will be placed on the development of criteria for priority pollutants. Limitations will be placed on each discharge pipe in the permit. In the Y-12 permit, there will possibly be over 100 point source discharges that will be individually controlled. The Department of Energy has provided some information and will continue to provide information necessary for the permit. The Clean Water Act provides for stiff penalties for falsification of any data relative to a permit application and we have no reason to be in any way concerned over the data that DOE would provide in support of their permit. Problems with developing the permit relate to waste characterization of the existing discharges and sources of contamination at this site which will be required to write a permit.

The Environmental Protection Agency has conducted a compliance evaluation inspection at all three DOE facilities. Following issuance of the permit, compliance inspections will be conducted annually as a minimum. The State, through the Basin Office in Knoxville, will likely visit the site more often. I believe that Region IV has adequate enforcement resources necessary to ensure compliance with the NPDES permits when they are issued.

6 Q. Were the CERCLA 103(c) site notification forms DOE sent to EPA wholly accurate? In particular, do the statements a) "small amounts of PCBs" are in the Chestnut Ridge sludge pile and b) "no groundwater contamination was found" surrounding the Waste Oil Landfarm accurately reflect the true situation?

6 A. In completing the CERCLA 103(c) site notification forms, EPA did not require a notifier to painstakingly document the information submitted. The information submitted may be based on knowledge, belief, recollection, or reasonably available records. The forms were complete.

The statement about "small amounts of PCBs" in the Chestnut Ridge sludge pile reflects the true situation based on analysis of sediments deposited since 1973. Five (5) samples taken show PCBs to be an average less than 50 ug/g. Additional data have been requested as of August 10, 1983. The statement about groundwater at the waste oil land farm was qualified because DOE was monitoring for total organic carbon and not heavy metals. The heavy metals should be bound up in the soil. Additional groundwater monitoring is being obtained.

7 Q. EPA's STORET system contains mercury readings in surface water of up to 9.1 ppb in the Clinch River just above the Melton Hill Dam. Does EPA consider this cause for concern? Has EPA searched its existing data bases for additional information about mercury and other pollutants in the Oak Ridge area?

7 A. EPA is very much concerned with the levels of mercury at Oak Ridge and the surrounding environment. We have and are continuing to review data for any further information on mercury or other pollutants in the Oak Ridge area. The most exhaustive effort in this regard to date is the activities of the interagency task force which was established under the MOU. This group of scientists and engineers has been charged with reviewing all of the existing data on mercury and other pollutants in the Oak Ridge area, evaluating the existing contamination and formulation of remedial plans. I have attached a summary report which was prepared by TVA entitled, "Summary of Existing Water, Sediment, Fish, and Soil Data in the Vicinity of the Oak Ridge Reservation - August 18, 1983." I believe you will find that this report is the most comprehensive document presently available regarding this subject.

8 Q. Why did EPA not press DOE for more relevant data when DOE sent only the "EP toxicity" data for mercury in sediments, given that EPA regulations define mercury as a hazardous waste whenever it is spilled?

8 A. Since the mercury spills occurred prior to November 1980 these actions and any associated clean-up would be regulated under CERCLA and not RCRA. In reviewing DOE data on sediments in New Hope Pond and other locations, EPA has told DOE that not only must the characteristic tests be done (which includes EP toxicity), but that DOE should also consider whether or not the sediments and sludges were formed as a result of a discharge of a listed hazardous waste.